

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Chapin Pneumatic Process of Making Wrought Iron.

The Chapin Pneumatic Iron Company, of Chicago, Ill., have just favored us with full particulars relative to their improved process of making wrought iron, and we take pleasure in presenting them to our readers, together with the accompanying engravings. The process, in brief, consists in the use of the air blast as a purifying agent in working iron in connection with a reverberatory furnace in one continuous operation, and results thus far gained are said to have been satisfactory. As a general thing, the good qualities of several mechanical puddlers have not yet been able to outweigh their defects, and the numerous improvements put upon the ordinary puddling furnace have not yet been able to obviate the necessity of a large amount of exhausting and costly labor, or the necessity of using an expensive "fettling." The lack of homogeneity of product, demanding an additional waste before it can be reduced to a merchantable shape, is another item of no little importance, and the air blast must be accepted as the most efficient and economical agent in reducing cast iron to a wrought condition. Mr. Chapin, in carrying out his invention, has sought to avoid the acknowledged difficulties of the mechanical puddler and the generally accepted defects of the stationary puddling furnace. A plant claiming to solve the problem has recently been erected near Chicago, and besides the blast-furnace engine, not here represented, consists of one elevator, one cupola, one converter, four ballers with attached furnaces and flues, one elevated track for traveling-ladle truck, one stack and one Winslow squeezer. The plant, as here shown, is but a half or a single plant, but is constructed on a plan which anticipates its being easily doubled in size and quadrupled in capacity. A double or full-sized plant, beside the blast engine and elevator, not represented in our engravings, would consist of two cupolas, two converters, extended traveling-ladle track, ten or more ballers, one stack and one squeezer, as now, and have an estimated capacity of 250 tons daily. By locating the plant near the blast furnace and taking the iron from it direct to the converter, the expense of the two cupolas and of handling and melting the pig could be dispensed with, and thus appreciably affect the economy of the process. In our engravings, Fig. 2 represents a plan showing the general arrangement of the converter and four ballers; Fig. 3 is a front elevation, and Fig. 1 a side view. The blast engine (not represented in the engravings) would have a pressure of from 15 to 18 pounds. The cupola used is Colliat's patent, which melts 10 pounds of pig with one of coke. The converter is the usual Bessemer converter, but so arranged as to admit of its receiving the metal on one side and discharging it on the other. It is worked by a small, double-linked engine, with an underground shaft gearing into a vertical shaft, which operates a worm-wheel attached to the trunnions. A truck carrying a ladle for distributing the metal to the ballers travels on the elevated track shown. The baller is a large bulging cylinder, appropriately lined and adjusted to a furnace in the rear and a flue in front, which connects with a high stack through an underground flue. The stack, which is situated at the left, is not shown. The ballers are mounted on carrying-wheels, and are also furnished with large gear-wheels, into which are fitted small spur-wheels playing on a counter-shaft. These counter-shafts are furnished with friction-wheels, operated by levers and worked from

have been heated and are revolved while receiving the metal. This motion is continued till the balling is completed. The time required in the ballers is very brief, depending, however, on the conditions of heat and of the iron received.

When the balls are ready for the squeezer, the flues in front are turned on their centers, which are at their connections with the underground flue. These movable flues, as

present plant the quantity for each heat is very much reduced and thus also the aggregate of a full day's work. With a single converter, when the bottom is worn out, operations must be suspended till it can be replaced by another, and the interruption is an item of much importance from an economical point of view. The transferring of the purified metal from the converter to the ballers by means of the ladle is a very

of the acid, is dispensed with and its large expense made unnecessary. The lining of the ballers is, in fact, practically self-sustaining. Without any repair these linings of ore are said to go on from week to week without any perceptible loss. With the fettling disappears also that lack of homogeneity which is characteristic of muck bar and is removed only by future expensive operations. In this manner, also, a large percentage of waste is saved. Attention is called to still another important point. Mr. Chapin remarks that the strong affinity of phosphorus for iron seems to increase with the rising heat of the blow, and does not begin to relax until the carbon is gone and the iron itself is ready to be destroyed by oxidation. By this process, however, when the silicon, sulphur, carbon and other impurities, under the rising heat of the converter, are greatly reduced, the metal is transferred to the baller and on to a basic lining, the temperature at the same time being much lower. Here it is possible to attack this persistent enemy of iron and steel. A comparison of the analyses of the pig used and the finished product shows an elimination of phosphorus so marked as to encourage the largest expectation of com-

use of the other than would have been anticipated.

The following table will give the results of the tests made at the works of Rust & Coolidge, bridge builders, in Chicago, and also by Colonel Flagler, of the United States Arsenal at Rock Island:

No.	By whom made.	Elastic limit per sq. in.	Ultimate tensile strength per sq. in. Lib.	Extension per in. of length.	Reduction from.
1	Colonel Flagler.	57,442	0.117	.82" to .696"	
2	" "	54,073	0.119	.63" to .52"	
3	" "	61,334	0.117	.57" to .418"	
4	" "	50,497			
5	Rust & Coolidge.	31,321	59,587	20	34
6	" "	36,923	67,690	13	28
7	" "	35,384	67,690	13	28
8	" "	35,816	59,750	17	22
9	" "	34,590	54,320	21	22
10	" "	35,555	61,155	18	
11	" "	36,654	63,709	10	

Nos. 1, 2, 5, 8 and 9 were made from No. 3 mill pig, which analyzed .35 per cent. of phosphorus and contained 44 per cent. of mill cinder. Nos. 3, 6, 7, 10 and 11 were made from a higher grade of pig—No. 2 Bessemer—which contained .127 per cent. of phosphorus, was highly silicious and contained an ordinary amount of sulphur. No. 4 was a piece of muck bar as it came from the rolls, and was not cut and piled. The other samples were from iron cut and piled from the muck bar, but once only. The inventor claims that the iron is fibrous in structure, homogeneous, ductile, weldable in high degree, elastic, and in every way answering the demands of the most excellent iron, even when made of the pig above described.

So far as the cost of plant and the expense of running the plant are concerned, Mr. Chapin states that the process contemplates the utilizing of all the parts of the rolling mill, except the puddling furnace and the usual "coffee-mill" squeezer. These it seeks to supplant. The substitutes for these provided by this process are claimed to effect an economy in cost of plant of from 30 to 40

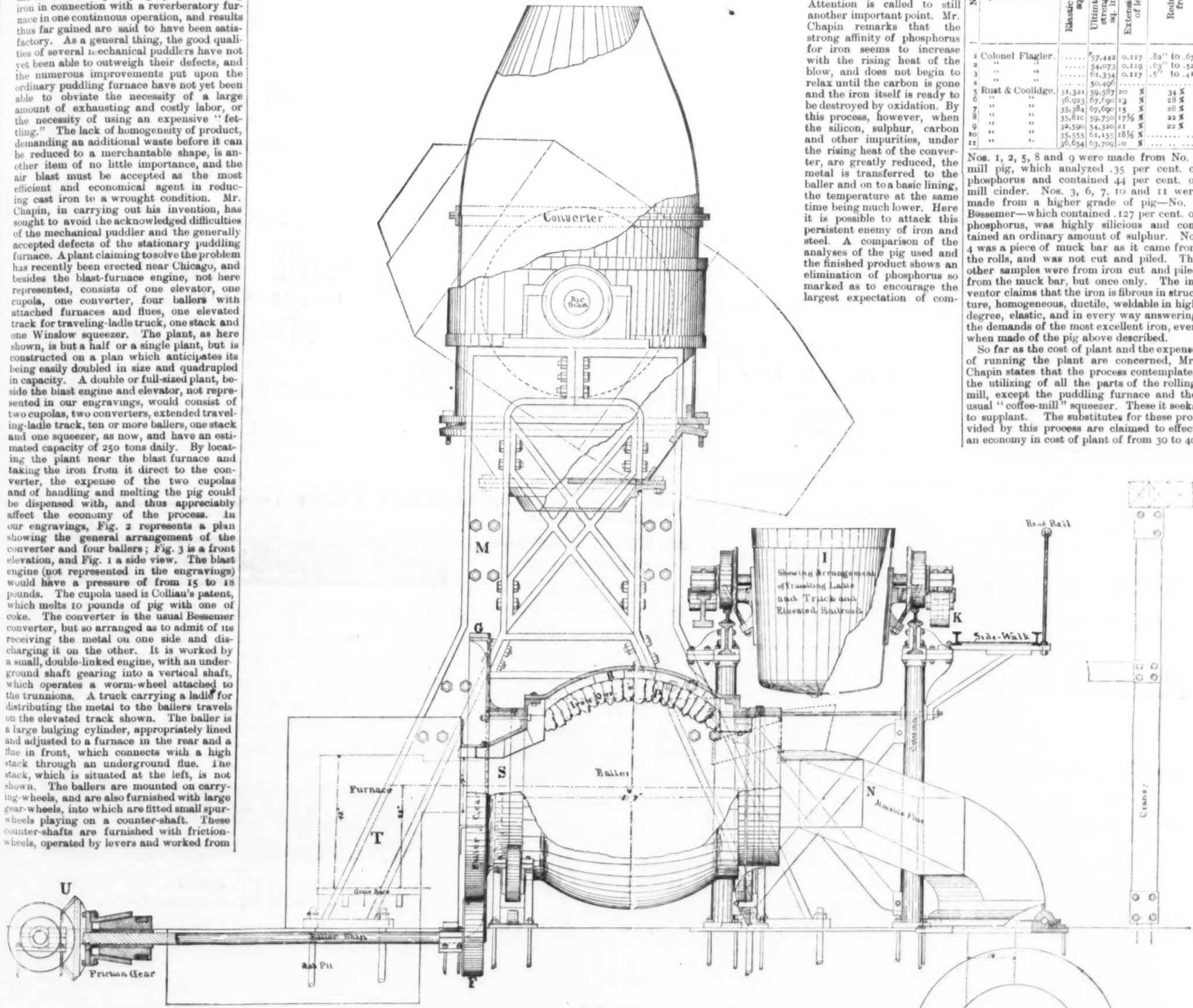


Fig. 1.—Side Elevation of Plant.

THE CHAPIN PNEUMATIC PROCESS OF MAKING WROUGHT IRON.

the main shaft, also underground. The latter is connected with an engine in the rear and to the left. The friction-wheels serve to set the ballers in motion, and may be started or stopped at will. The squeezer is of the ordinary Winslow pattern, and is conveniently located in front of the ballers.

From this description of the separate parts of the plant, it is easy to follow the continuous process from the introduction of the pig into the cupola till it reaches the finished bar. The molten pig metal is first tapped into the charging ladle in front of the cupola, as shown in Figs. 2 and 3. The converter is now turned down toward the cupola to a horizontal position to receive its charge, after which it is again turned to an upright position. Blast is applied as in the ordinary Bessemer converter. At the end of the blow the converter is turned down and its contents quickly emptied into the traveling ladle, which distributes the metal to the several ballers. The latter in the meantime

already stated, are mounted on carrying-wheels, and may thus be moved far enough to avoid the door of the baller, which is thrown open to the left on its own center, as shown in Figs. 2 and 3. The chamber of the baller is thus exposed and the mass of metal is removed and carried to the squeezer by means of a large fork attached to a traveling lever. From the squeezer the ball is taken to the furnace for a wash heat before rolling. The ball, as it leaves the squeezer, is 10 inches in diameter and its length proportional to the quantity of metal. The time required for the process, from the metal being taken into the converter till the ball is taken to the heating furnace, is said to be not more than 25 minutes, and from this to the finished product the process should be continuous to secure the best results. With a full plant of 12 ballers and two converters running continuously, two heats of 5 tons each can be taken off every hour, and an output of 250 tons in 24 hours may thus be reached. In the

simple operation and is easily accomplished. The cinder from the blow of the converter is left in the ladle and is then removed as from the Bessemer ladle. Only the purified metal finds its way into the baller.

Among other points of interest in connection with the process, Mr. Chapin directs attention to the character of the baller linings. These linings, as shown in Fig. 1, consist of a layer of fire-brick, upon which is fixed an arch of suitable refractory iron ore, 6 or 8 inches thick. This is grouted with pulverized ore and a bottom made upon it, as in the common puddling furnace. The entrance and exit for the flame is furnished with a lining of fire-brick. The silicic acid being removed from the metal before it is transferred to the oxide lining of the baller, the usual acid reaction so destructive and wasteful in mechanical and stationary puddling furnaces is avoided. The whole process of "fettling" used for the purpose of repairing this wasteful action

plete success at this point. So far as the quality of the product is concerned, Mr. Chapin informs us that the pig used thus far has been mainly what is known as a No. 3 mill pig, made partly from the poorer qualities of the ores from the North, with a mixture of from 25 to 45 per cent. of puddle and other mill cinder. The analysis of this pig has shown from 3 to 5 per cent. silicon and from $\frac{1}{4}$ to $\frac{1}{2}$ of 1 per cent. of phosphorus. From this quality of pig the greater number of the results in the following table have been gained. In a few heats a better quality of pig has been used, which was rated No. 2 Bessemer. This showed a reasonable percentage of silicon, but the phosphorus has been as high as .127 per cent. Some of the best results, as will be seen, have been gained from this pig. Still, the results show less advantage from the use of this better quality of pig over the

per cent., and add the same amount of work in a given time, as compared with the cost of a plant of common puddling furnaces. The items of labor, fuel, repairs and waste in the new process are widely different from those accompanying the ordinary puddling process. In a general way, and without pretending to be exact, Mr. Chapin puts the labor expense at \$1.50 per ton; fuel, \$1.50; repairs, 50 cents, and waste at about 20 per cent. of the cost of the pig.

These figures are subject to modifications which come from size and output of plant, (Continued on Page 19.)

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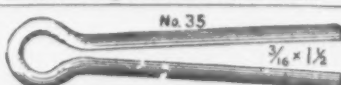
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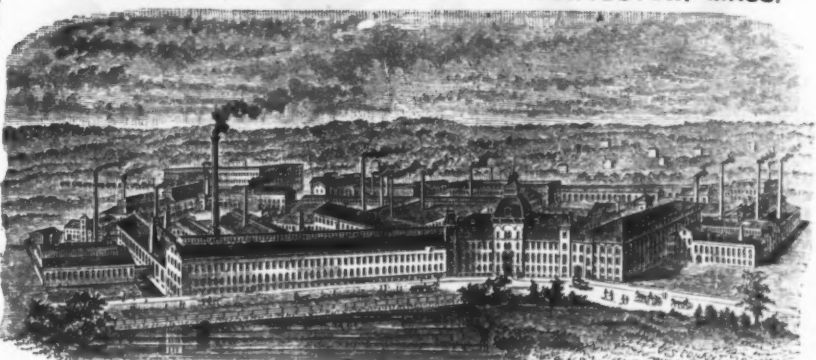
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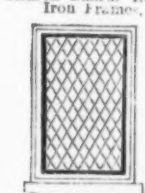
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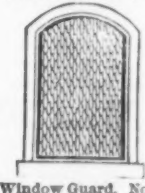
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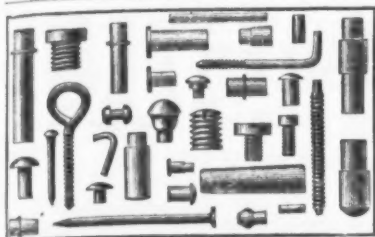
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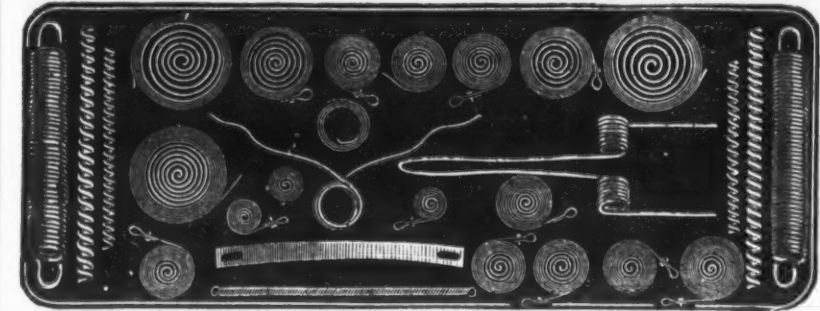
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German Railway Tests for Iron and Steel.

The London *Engineer* remarks that a controversy between the Association of Iron Founders and the Union of German Railway Administrations has brought forward the test question with a certain degree of prominence in the technical press of Germany. One of the most comprehensive articles published on the subject is that which appeared in a recent number of the *Zeitung des Vereins Deutscher Eisenbahn Verwaltungen*, in which Herr Wöhler has reviewed the past history of the controversy, and has endeavored to refute the attacks on his system of classification which were made at the recent Düsseldorf meeting of the iron and steel industry. The action of the railway companies with respect to the question of classification was, it would seem, occasioned by the want of due observance by manufacturers of the needful measures for arriving at excellence in quality, and in their memorial to the Government in 1877, the companies alluded to the opposition which would probably be made by the iron and steel industry to the introduction of the new regulations then under discussion, by reason of the trouble and expense involved in making the trials and researches which would, under the circumstances, be rendered necessary. Since then the principles of these tests have been criticised in a hostile spirit at various assemblies of the industry affected by them, and ineffectual attempts were made at one time to get the objectionable conditions modified by the Minister of Public Works.

At the meeting held at Düsseldorf on December 10, 1882, the principles of Herr Wöhler's system were again attacked by several manufacturers, and in his brief reply, published in the *Cologne Gazette* shortly afterward, that gentleman defended his method. It consists in measuring the resistance to fracture, and the tenacity of the metal by the contraction in the cross-section after fracture. He alludes in his explanatory remarks to the difficulty of accurately measuring the extension of length at the point of fracture, while there is no difficulty in arriving at it by means of the easily-measured contraction or diminution of the cross-section. In his more detailed remarks in the technical journal already referred to, Herr Wöhler alludes to the fact that if an iron or steel bar is bent by external force, it is first subjected to an elastic extension, and if the force is removed it again takes its original shape. If, by the application of greater force, the limits of elasticity are passed, there is then a permanent extension, the amount of which gives the measure of its tenacity, while its strength is indicated by the amount of force necessary for its fracture. The qualities are independent of each other, but if two similar bars which possess equal tenacity, but different strengths, are subjected to the same exertion, the weaker of the two will, it is considered, extend more than the stronger one, in the same way as with two bars of the same material but of different thickness, the thinner is more extended than the thicker one under an equal burden. The volume of a body is not changed by extension, and therefore a contraction is normally allied with it. Thus the extension in a longitudinal direction of a round bar causes a diminution of its cross-section in the same proportion as its length increases. If the extension takes place equally through its whole length, the contraction—or diminution of cross-section—is throughout alike, and the measure of extension is simply given by the difference between the original and the subsequent length, in reference to the former. This can also be given correctly by the difference between the original and the subsequent cross-section, in reference to the former, and both systems of measurement must give uniform results. This is, however, not the case if the material of the bar is not equal throughout, in which case there will be an inequality in the extension corresponding to the difference which may exist in the strength of the various parts. The weaker portions extend more than the stronger, and therefore Herr Wöhler argues that the extension for any particular part of the bar can only be found by measuring the contraction at each place, and not from the difference in length.

From these facts he infers that every iron or steel bar which is extended acquires in the direction of the extension a greater degree of strength. In order to extend it further the burden must be increased, and then the extension is increased until the strength has again been sufficiently augmented to allow the bar to support the increased weight. With an equal increase of the burden the corresponding increase of extension is not the same, but gradually increases, while the cross-section diminishes. If the extension has reached a point where the diminution of the cross-section surpasses the increase of strength arising from the greater extension, then, provided the tenacity is not exhausted, the extension can, it is true, be continued; yet the burden cannot be increased, but further extends the bar in a more rapid manner until it is broken. Even an unavoidable difference in the strength of a material suffices to produce this effect at one part of the bar somewhat earlier than in other portions. If the same trial is then made on one of the broken pieces, the effect referred to manifests itself in another portion of the bar. These facts are considered as indicating the advantages of estimating the regularity and equality of the material by the relation between the extension of the bar and the contraction. In good tough steel it is said that this proportion is approximately 1:2—only an approximate estimate of the tenacity can be deduced from the extension, and this is less likely to be exact according to the greater irregularity of the material.

While thus advocating the principle of taking the contraction in the cross-section of fracture as indicating the tenacity of the material, Herr Wöhler admits that there may be some exceptional cases in which this method is not applicable, and on which objections have been founded by the opponents of this system. He considers that the method in question displays every fault of the bar which is being tested, and thus facilitates the task of the officials in charge of the examination of the material submitted.

Though the test may present some inconvenience to one or other of the houses interested, it is argued that it is not in any way injurious to the interests of the manufacturers in general. In drawing up the conditions in question, the railway companies were influenced by the desire of assuring themselves that the material they received was of itself fit to be used for the various purposes for which it might be intended, and they based their action in the matter on the principle of keeping strictly in view in their tests the conditions and mechanical laws which become operative when the materials are in actual use.

In his comprehensive article, Herr Wöhler enumerates the various kinds of injury and wear to which axles, tires and rails are subject, and remarks that under normal circumstances railway material is not forcibly torn, bent or broken, and that when such violent force is brought to bear on it, then the limit of human precaution has already been passed. On the other hand, he considers that scientific tests have to be arranged in view of those small and sometimes almost imperceptible movements which, by their frequent repetition, affect the durability of the material subjected to their influence. The test applied by the Imperial Railways of Alsace-Lorraine, of which Herr Wöhler is manager, in the acceptance of axles, involves the sample bar being subjected to a load of 34.02 tons per square inch of the cross-section during ten minutes, without any further extension taking place during that time. If this test is withstood, the bar is subjected to a further weight until it is broken. After being broken, the cross-section of fracture must not exceed 65 per cent. of the original cross-section. Various facts are quoted from the records of the Alsace-Lorraine Railway Direction, with a view of proving that the working of the new regulations has been in no lasting way onerous to the manufacturers interested, inasmuch as there has been, since they came into force, a gradual diminution in the quantity of rejected material. The following table explains this assertion more fully:

	Accep.	Rej.	% Rej.
Tough steel tires, 1880...	4763	196	4%
" " " 1881...	4461	30	2%
Tough steel axles, 1880...	2089	99	4%
" " " 1881...	3259	11	1%

In the instances of the rejections made in 1881, there were circumstances indicating the accidental nature of the defects by which they were occasioned. The deliveries of rails seem also to prove that the new regulations have not presented any serious difficulties to manufacturers. In 1879 a contract was made for about 100 miles of rails, which was divided between two establishments. The quality figure arrived at by the sum of the figures of strength and contraction reckoned by the German standards, and subject to certain limits in their respective proportions, was fixed at 85, in accordance with the recommendations of the Salzburg Congress; but it was also stipulated that if the works delivered at least three-fourths of their respective quantities in a superior make with the quality number 90—while still maintaining a strength of at least 38.1 tons per square inch—the price for the proportion of superior rails would be increased by 3 per cent. It resulted that each establishment delivered about four-fifths of its quantity in the better quality and in accordance with the required strength. The remainder of the deliveries were even higher than 90 in quality, being above 100 in one case; but being about two tons under the strength fixed, were consequently not reckoned as superior to the standard. It is, however, remarked that the Salzburg Congress had fixed the standard of strength at about 32 tons. It is supposed that this increase of the quality number beyond 85 did not augment the cost of production by 3 per cent., because the works would not have delivered the better quality if there had not been some advantage for them in doing so. In his address on the subject, delivered by Herr Wöhler, before the Verein für Eisenbahnkunde some 12 months ago, he expressed his opinion that the deliveries made during 1881 manifested a surprising uniformity, proving that homogeneity is increased in proportion to the improvement in quality. The manufacturers deny, however, that this improvement has been brought about by the new regulations, taking to themselves the credit of having thus raised the standard of their productions by their own independent exertions in that direction.

Herr Wöhler, in his most recent communication to the technical press of Germany, disputes at considerable length the assertions made at the Düsseldorf Congress, last December, by his opponents, and the results which were there described as having been obtained from experiments made by certain manufacturers. Further experiments would seem to be contemplated by them, with a view of elucidating the different effects produced by sudden and gradual imposition of burdens for the purpose of testing. He refutes in a categorical manner the arguments deduced from experiments made as to the influence of the reduction of thickness, by hammering, on the effective properties of steel. He maintains that railway engineers have many difficult problems to solve, for which perfection of material is indispensable, and expresses his surprise that manufacturers should oppose such a requirement if railway companies are willing to pay for it. The manufacturers' organization has published a letter in the *Cologne Gazette* stating that the cause of the quality of the rails alluded to being above the standard was that the application of the tests is sometimes made in a stringent manner, and under circumstances which treat insignificant defects in such a way that, as a measure of precaution, the quality is made above the standard. The part of Herr Wöhler's remarks dealing with the question of the business profit which must have resulted to the manufacturers does not seem, however, to have been dealt with.

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ore in the United States, being the same as that from which the celebrated Russian and Swedish iron are made. It has been lying idle because there has been no means of transporting its products, but now a railroad is proposed from some near point on the Central Pacific, to run through Sierra Valley, tapping its agricultural resources and the immense tracts of timber in the vicinity, and from thence into Mohawk Valley to the mine. A surveying party may be set to work this fall making the preliminary surveys, and it is thought that within two years the mine will be turning out its products to the world. J. W. Harrison says in his circular that the consumption of iron this week has been large, considerable being melted. Very few sales to note, as consumers are all carrying full supplies and do not anticipate much change in price, as there is considerable on the way, most of which has already been disposed of. The Clipper Gap furnaces are turning out a large quantity of first-class iron, for which they find a ready sale; it is a marked improvement on their first output. Oregon iron is again coming in to market, and is held at about the same figures as Clengarnock. Clipper Gap iron is considered superior to all other kinds, and will soon be extensively used here for nails, stoves, &c.

The Wages Question in Massachusetts.

In the fourteenth annual report of the Massachusetts Bureau of Statistics of Labor some statistics of wages, profits and earnings are presented in a novel manner. Wage statistics are usually given in detail for the individual, or in averages for an industry, city or State. In the presentation referred to the establishment or factory is taken as the unit, and we are supplied with an opportunity to compare factory with factory. An examination of these statistics discloses some facts in relation to wages which seem particularly valuable. Twenty-one industries, employing 207,793 persons out of 352,255, the grand total of the State's operatives, are given in detail, but it will be sufficient for our present purpose to consider one industry and the State aggregate. The figures we present are drawn directly from the bureau report, and manifestly only relate to wages in Massachusetts.

In 1880, in the worsted-goods industry in Massachusetts, there were 16 establishments, employing 2488 persons, of which 995 were men, 1219 were women, and 274 youth and children—that is, 60 per cent. were women and children. The average yearly earnings were \$290, or \$5.57 per week for each employee, whether man, woman or child. The actual average yearly earnings paid in 15 of the factories were as follows: \$249, \$245, \$250, \$204, \$222, \$315, \$202, \$317, \$313, \$405, \$315, \$380, \$468, \$329, \$210—that is, in six of the factories the wages were below the average, and in nine they were above. This would seem to show the unfairness of applying a general average to a local case. For instance, the operatives receiving \$204 per year are not improved in their financial condition by being informed that the average wages in their industry is \$290, or the highest \$468.

The bureau, in its discussion of the question of profits of manufacturers, allowed them 6 per cent. of the capital invested as interest, and 10 per cent. of the value of product for all expenses of carrying on business. In the worsted industry the average yearly product for each employee was \$2003, made up as follows:

Value of materials used by each employee, \$1,384.67
Wages paid each employee, 290.04
Interest and expenses (as above), 243.48
Net profit to manufacturer on each employee, 84.21

Average yearly product for each employee, \$2,003.00
The interest, expenses and net profit aggregates \$327.69 for each operative, as against \$290.04 in wages. If the operative received all, or \$618.33, it would amount to \$11.85 per week—that is, if the average weekly wage of operatives in the worsted-goods industry in Massachusetts was \$11.85, it would allow of no return to the manufacturer, excepting for the value of materials used for each employee. The bureau allowance for interest of 6 per cent. on the capital invested, and thereafter an equal division between manufacturer and employee, results as given below:

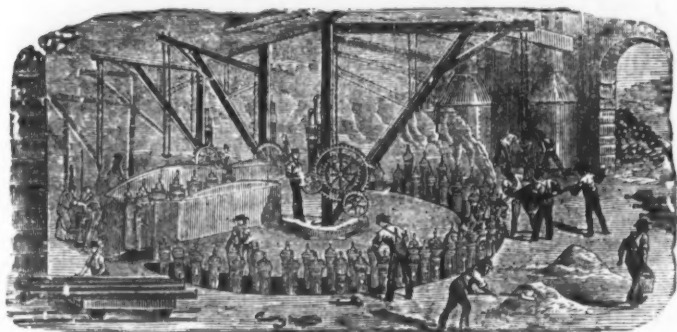
Value of materials (each employee), \$1,384.67
Six per cent. on \$753, capital invested for each employee, 42.18
One-half of balance to manufacturer, 287.57
One-half of balance to operative, 287.58

Average yearly product for each employee, \$2,003.00
The employee does not gain by this industrial partnership. His wages were \$290.04. His profits are \$287.58, or a net loss to each employee of \$3.06, and a corresponding net gain to the manufacturer. In other words, in the worsted-goods industry in Massachusetts the wage system gives the operative more on an average than would an equal division between manufacturer and operative, after allowing the former for the cost of materials and 6 per cent. on capital invested. It is manifest that the manufacturer makes his half on each of his operatives, and that his aggregate is a very large sum. This is true, but we have seen that if the operative took all, he could secure but \$618.33 per year, or \$11.85 per week, and from this would have to be deducted all interest charges and expenses for carrying on the business.

An examination of the 16 establishments in detail brings important facts to light. We find that eight establishments made a net profit over and above the 6 per cent. for interest and 10 per cent. for expenses. In these establishments there were 931 employees. On the half-to-operative plan each would get \$432.07 annually, but in the other establishments, with 1557 employees, this plan would give each operative but \$199.97 annually. Obviously, it would only pay the employee to become an industrial partner in those firms which are making a good profit. In case business should be disastrous the wage system seems to have manifest advantages, especially as wages constitute a preferred claim at law. It would be manifestly impossible to have an elastic partnership between manufacturer and operative, by which the operative should receive good wages when business is unprofitable and good profits when it is remuner-

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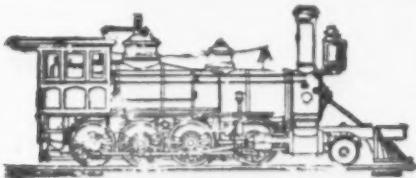
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ative. There would probably be no difference of opinion on this point between political economists and workmen who intelligently consider the situation.

The bureau results, which we have recapitulated in the preceding statements, as regards the worsted industry in Massachusetts, are fully sustained by the State figures for all industries. We present two showings for comparison with those for the worsted industry:

ALL INDUSTRIES—STATE OF MASSACHUSETTS.	
Value of materials used by each employee.....	\$1,098.55
Wages paid each employee.....	364.58
Interest and expenses.....	230.92
Net profit to manufacturer on each employee.....	97.95

Average yearly product for each employee.....\$1,792.00

On the half-to-manufacturer and half-to-operative plan:

Value of materials used by each employee.....	\$1,098.55
Six per cent. on capital invested (\$872.46) for each employee.....	52.75
One-half to manufacturer.....	180.85
One-half to employee.....	320.85

Average yearly product for each employee.....\$1,792.00

As in the case of the worsted industry, the half-and-half plan gives less to the employee for profits than the ruling wages, the annual loss to each operative being \$43.73.

The possibilities of the prevailing wage system and of some system of industrial partnership, as regards the wages of employees in the manufacturing establishments of Massachusetts, are strongly outlined by the preceding exposition of facts that we have drawn from the bureau report.—Bradstreet's.

Stability of Merchant Steamers.

The very numerous class of ocean steamers known on the Maritime Exchange as "tramps," as is well known have not the highest reputation for safety, whatever may be the advantages they offer for carrying freight at comparatively low rates; but the time is apparently at hand when it will be a question whether these advantages will not be considered as more than counterbalanced by the heavy risks of one kind and another consequent upon defective models, inferior materials and cheap workmanship, from all of which, it is claimed, and no doubt justly claimed, the regular liners are exempt. Marine architecture of late years, it must be admitted, has made surprising advances, and the number of merchant steamers launched, especially from the English and Scotch yards, have been large enough to supply all the maritime countries of the world with what in former years would have been considered as a respectable fleet; but, in view of the numerous disasters, resulting often from the difficulty of handling the new models, it is suspected that the models themselves are defective in the all-important qualities of stability and safety.

On these points an exhaustive official report upon the "Daphne" disaster, recently submitted by Sir Edward Reed to the London Board of Trade, and reproduced in some of our British contemporaries, conveys much important information of a highly suggestive character. The general confidence which has all along been felt in the growing stability of high-sided ships, we are told, has exercised a widespread influence upon modern mercantile shipbuilding, and has encouraged people to be satisfied with very small initial stability, and, in some cases, none at all, or even worse than none. Not only this, "many steamships of large tonnage have been built of late years for influential steam companies and other owners, which ships are wholly incapable of floating upright without the aid of ballast or cargo, and which cannot be unloaded in dock without being held upright by hawsers attached to the shore. Such ships, even when capable of floating unballasted without capsizing, can only do so by lolling over at large angles of inclination, and there finding a position of stable equilibrium."

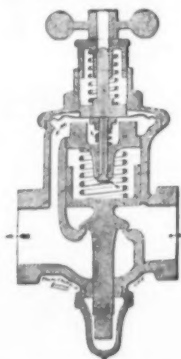
The importance of these statements will at once be recognized; yet Sir Edward is careful to warn the reader against drawing from them false deductions. He points out that it is not necessarily a bad or dangerous thing for a cargo-carrying ship to be without stability when empty. When carefully watched over and stowed with suitable cargoes, such ships can be made quite safe at sea. It is even possible for them to be made safer than some other ships which may have greater stability at and near the upright position, but, owing to their low freeboard or other like defect, may lose their stability much earlier. In all the discussions that have hitherto taken place at the Institution of Naval Architects upon the stability of merchant steamers, this question of the loss of stability from low freeboard has been much considered. It has been stated repeatedly by competent authorities that ships which even when at sea prove themselves incapable of keeping upright, from a deficiency of initial stability, and which have to loll over to one side before finding any stability at all, do nevertheless possess more safety at sea than many ships which are "stiff" when upright and moderately inclined, but have a very small "range" of stability. These latter, if thrown over on their beam ends, or even much less largely inclined, lose all stability and are hopelessly gone, whereas the "crank" ship may gather stability over such large angles of inclination as to be actually incapable of capsizing unless the sides or decks admit the sea. Now, it is to high sides that this great range is due, and to the want of them, or, in other words, to low freeboard, that the capsizing of merchant ships has been mainly attributed, the shifting of coal and grain cargoes often contributing to the result. "There is not the least doubt," we are plainly told, "that the very small initial stability given to many modern mercantile steamships has resulted in the capsizing of many ships at sea, and in grave danger to many that are still afloat." Nor is this assertion allowed to rest upon the opinion of Sir Edward alone; very high authorities are quoted in its support. Mr. Benjamin Martell, chief surveyor to Lloyd's Register in London, stated not very long ago, when speaking of certain modern types of steamers: "It may be said almost with certainty that many of these steamers combine in themselves many of the worst

features which contribute to instability and consequent unsafety." And Mr. William John, who is regarded as a high authority upon the subject, said, in 1881: "I believe most sincerely that the great proportion of disasters at sea is due to want of stability."

The London Times in reviewing the report characterizes its disclosures as of "grave public interest," and remarks: "We know it to be the fact that several vessels ranking high as passenger steamers are among those which are best known as examples of this state of things, and which have excited most interest and comment in professional circles." There will undoubtedly be universal assent to the proposition that "it is high time that the settled knowledge of the stability of ships became diffused among stevedores and captains, and, more important still, fully recognized and acted upon by the Board of Trade." It is startling to be told that the Board of Trade examinations for seamen who are to command and handle these modern steamers, with stability varying both in port and on the voyage with every addition or subtraction of fuel and cargo, in no way recognize this subject or suggest its importance. It is scarcely less startling to be told, as we are in this report of Sir Edward Reed's, that ships are doubtless lost at sea from instability, but "at the official inquiry held to investigate their loss the question of stability may never be even mentioned."

The Curtis Pressure Regulator.

The accompanying engraving shows a new pressure regulator, manufactured by the Curtis Regulator Company, of No. 61 Beverly street, Boston, Mass. The sectional view represents a main valve operated by a loose-fitting piston; a secondary valve in the top of the chamber over the piston; a metallic diaphragm (performing the double office of operating the secondary valve and making a joint to the cap which contains it), and a side passage, connecting the chamber under the diaphragm with the outlet. When the spring over the diaphragm is compressed the latter gives way, and thus opens the secondary valve upon which it rests. Pressure



The Curtis Pressure Regulator.

being let on raises the piston, and consequently the main valve, to its full capacity. The main valve remains open until the back pressure, communicated from the outlet through the side passage, is sufficient to raise the diaphragm and thus close the secondary valve, when the steam or water, escaping around or through the loose-fitting piston, fills in the space on top of this piston and forces it toward its seat, thus uniformly maintaining the pressure at which it is set.

The purposes to which it may be applied are various, and thus far it seems to have given entire satisfaction. The valve, as will be seen, contains a combination of old and established principles, and occupies the same space as a globe-valve for the same size of pipe. There are no glands or packing, and the seat may be made of any suitable material for steam, water or any other medium.

Solar Motors.

Among the companies recently formed in Paris is a society for the utilization of solar heat, with a capital of 1,600,000 francs. The problem which the patentees profess to have solved is as old as Archimedes, who is said to have set fire with burning glasses to the Roman fleet when besieging Syracuse. One hundred years afterward Hero of Alexandria constructed a solar fountain. In 1551, Adam Lonicer adapted solar heat to the process of distillation. In the next century various solar clocks were constructed, and the first hint was given of using the sun as a motive power. The first scientist to turn his attention to sun force as available for practical purposes in the present century was John Herschel, who constructed an apparatus for cooking by the sun's rays. Several Frenchmen continued the experiment, and solar pumps and hot-air machines were patented in France.

In 1860 Professor Tyndall, in the course of his experiments on lunar radiations, constructed a machine of great delicacy. It consisted of a cone-like reflector with a highly sensitive test in the center, on which all the rays striking the interior of the cone were reflected. In 1871 M. Mouchot adapted the idea to a sun machine, and exhibited it to the Academy of Sciences, in France, in 1877. Twenty thousand francs were granted by the Minister of Public Instruction to enable him to perfect his invention, and in the following year a further subvention was made by the Society for the Advancement of Science. In 1879 M. Abel Pifre took up the subject, and further subventions were made by the Government of Algeria. The company just formed do not profess to be able to do much in climates such as the north of France or England, but in the south of Europe, in Algeria, India and America, it is maintained that the invention will be of great value. In these countries fuel is often scarce, and a motor that will supersede steam produced by furnaces may effect extraordinary results where a cheap motive power is required.

It is claimed that sun force is far less variable than wind or water power. In the torrid zone the radiation of the sun remains nearly the same for many months, and presents a gratuitous power only waiting to be harnessed by science. For the purpose of irrigation, agricultural machines, mills, &c.,

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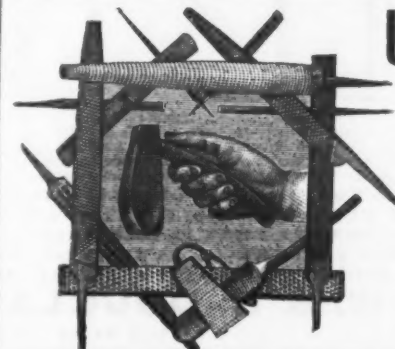
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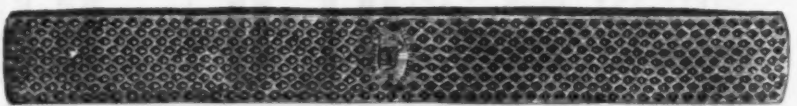
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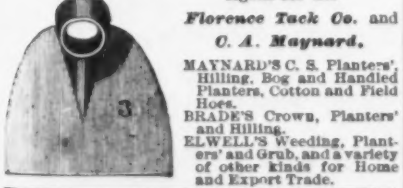
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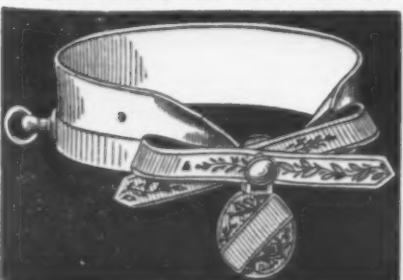


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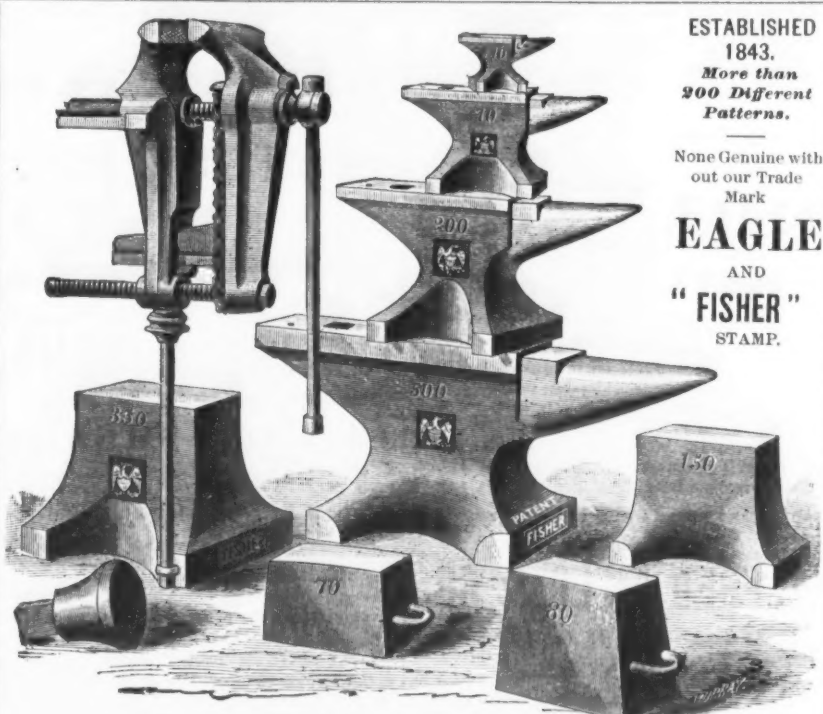
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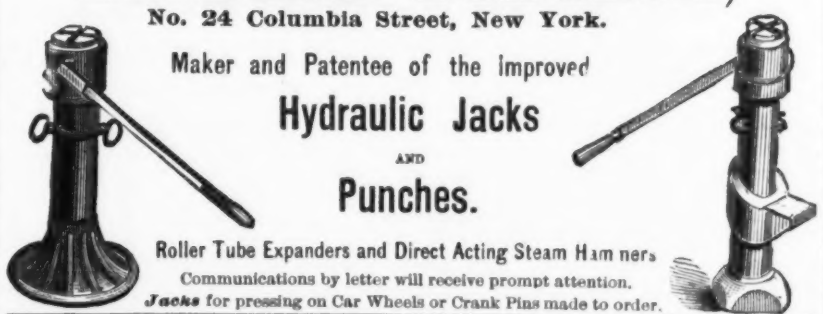


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also for the rectification of alcohol, distillation of perfumes, production of ice, the distillation of water for drinking, and many other uses requiring a low power cheaply produced, the promoters claim that their invention is valuable. No stokers are necessary, nor are explosives possible. All that is required is to keep the machine, like a large sunflower, always turned toward the sun.

The invention consists of a huge reflector not unlike an inverted umbrella, the interior of which is lined with a high reflecting agent. In the center of this and occupying the position of the umbrella stick is a standard boiler made of a material highly conductive of heat. This receives the rays from the whole reflector, and thus collects sufficient heat to generate steam. In addition to motors, the society supplies domestic sun machines which boil water, prepare tea and coffee, grill chops and steaks, fry eggs and cook other food. Portable machines are made for carrying on horseback, which boil water and serve a dinner on short notice. The company also supply scientific machines, and even furnish the same power in the shape of a children's toy.

Unfortunately, machines do not always realize the vivid hopes of their inventors, and practical people will doubtless wait before ordering a new solar motor.

Rates of Freight to and from British Ports.

A Glasgow paper, in dealing with the subject of freights has compiled the following tabular comparisons of rates to and from British ports this and last year, the outward prices being based on Bristol Channel cargoes for coal and iron:

Homeward.	RATES OF FREIGHT.			
	March, 1882.	August, 1882.	March, 1883.	August, 1883.
Calcutta, 1/2 ton (dead-weight).....	55 0 0	52 6 0	50 0 0	32 6 0
Bombay, 1/2 ton.....	37 6 0	35 3 0	35 0 0	28 9 0
Kurrachee, 1/2 ton.....	42 6 0	37 6 0	37 6 0	32 6 0
Java, 1/2 ton.....	75 0 0	65 0 0	55 0 0	45 0 0
Rice Ports, 1/2 ton.....	58 0 0	53 6 0	57 6 0	45 0 0
San Francisco, 1/2 ton, sailers.....	62 6 0	57 6 0	40 0 0	50 0 0
Valparaiso, 1/2 ton, sailers.....	50 0 0	47 6 0	40 0 0	43 6 0
New York, 1/4 quarter.....	4 0 0	5 0 0	4 0 0	4 0 0
Philadelphia, ".....	4 0 0	5 0 0	4 0 0	4 0 0
Baltimore, ".....	4 0 0	5 0 0	4 0 0	4 0 0
New Orleans, ".....	6 0 0	6 0 0	6 0 0	5 0 0
Montreal, ".....	12 0 0	11 3 0	11 0 0	10 0 0
Odessa, 1/2 ton (tallow).....	25 0 0	23 9 0	21 0 0	22 6 0
Nicholaïff, ".....	30 0 0	27 6 0	27 6 0	25 0 0
Azoff, ".....	35 0 0	33 6 0	31 0 0	27 6 0
Danube, 1/4 quarter.....	4 0 0	5 0 0	5 0 0	4 0 0
Sulina, ".....	4 0 0	5 0 0	4 0 0	3 6 0
Fiume, 1/2 ton.....	15 6 0	17 0 0	15 0 0	11 0 0
Carloforte, 1/2 ton.....	13 1/2 0	17 0 0	16 0 0	11 0 0
Portman to Cardiff, 1/2 ton.....	9 0 0	9 6 0	8 6 0	6 0 0
Fleetwood, 1/2 ton.....	10 6 0	11 0 0	10 6 0	7 3 0
Huelva to Liverpool, 1/2 ton.....	10 6 0	9 0 0	9 0 0	6 6 0
Rotterdam, ".....	10 6 0	9 6 0	9 6 0	7 3 0
Bristol Channel, ".....	8 0 0	8 6 0	9 0 0	6 0 0
Hilbao to Glasgow, 1/2 ton.....	11 0 0	10 3 0	9 4 0	6 10 0
Cardiff, ".....	9 0 0	8 6 0	7 3 0	5 6 0
Rotterdam, ".....	12 0 0	11 3 0	10 6 0	7 3 0
Tyne, ".....	12 0 0	11 3 0	10 6 0	5 9 0
Cronstadt to East Coast, 1/4 quarter.....	3 1/2 0	3 1/2 0	3 1/2 0	1 9 0
Riga to East Coast, 1/4 quarter.....	3 0 0	2 0 0	1 9 0	1 9 0
Riga to East Coast, 1/4 quarter (sleepers).....	10/9 0	12/6 0	8/6 0	10/6 0
Riga to West Coast, 1/4 quarter (sleepers).....	10/9 0	12/6 0	8/6 0	10/6 0
Baltic deal ports to London (deals).....	14 0 0	14 0 0	13 6 0	13 6 0
Lower Baltic ports to London, per quarter.....	2 3 0	2 3 0	2 0 0	1 9 0

FROM BRISTOL CHANNEL PORTS.

Outward.	RATES OF FREIGHT.			
	March, 1882.	August, 1882.	March, 1883.	August, 1883.
Montreal (iron), all 1/2 ton.....	14 0 0	10 0 0	9 0 0	8 0 0
New York, iron.....	14 0 0	10 0 0	9 0 0	8 0 0
Baltimore, iron.....	14 0 0	10 0 0	9 0 0	8 0 0
Philadelphia, iron.....	14 0 0	10 0 0	9 0 0	8 0 0
New Orleans, iron.....	22 0 0	13 6 0	12 0 0	10 0 0
Mediterranean, iron ore, to United States.....	18 6 0	11 6 0	10 6 0	8 6 0
Martinique, coal.....	17 0 0	12 0 0	12 0 0	12 0 0
Havana, ".....	17 0 0	12 0 0	12 0 0	12 0 0
Madeira, ".....	12 0 0	10 0 0	10 0 0	9 6 0
Singapore, ".....	19 0 0	22 0 0	21 0 0	20 0 0
Colombo, ".....	19 0 0	23 0 0	17 0 0	13 6 0
Bombay, ".....	17 0 0	20 0 0	16 0 0	16 0 0
Aden, ".....	16 0 0	22 0 0	15 0 0	16 0 0
Port Said, ".....	14 0 0	13 0 0	13 0 0	13 0 0
Alexandria, ".....	13 6 0	14 0 0	13 0 0	15 6 0
Odessa, ".....	12 6 0	11 6 0	11 0 0	10 0 0
Constantinople, ".....	12 0 0	11 6 0	11 0 0	10 0 0
Danube, ".....	10 0 0	14 0 0	13 6 0	13 0 0
Venice, ".....	14 0 0	12 0 0	11 6 0	11 0 0
Malta, ".....	11 0 0	10 3 0	10 6 0	10 6 0
Naples, ".....	11 0 0	10 3 0	11 3 0	11 3 0
Genoa, ".....	13 0 0	10 0 0	12 3 0	11 3 0
Barcelona, ".....	16 0 0	10 0 0	15 3 0	15 0 0
Gibraltar, ".....	9 0 0	9 3 0	8 0 0	8 3 0
Lisbon, ".....	8 0 0	8 3 0	7 6 0	7 6 0
Copenhagen, ".....	7 6 0	7 6 0	6 5 0	6 5 0
Cronstadt, ".....	7 6 0	7 6 0	7 0 0	4 9 0
Rouen, ".....	7 6 0	7 6 0	7 0 0	6 0 0
Havre, ".....	6 6 0	6 3 0	5 0 0	5 0 0
Bay Ports, ".....	7 1/2 0	7 1/2 0	7 1/2 0	6 1/2 0
Cronstadt (from Frith of Forth).....	7 3 0	6 3 0	4 3 0	4 3 0
Stockholm, ".....	7 0 0	6 0 0	6 0 0	4 3 0
Fairwater, ".....	5 3 0	5 0 0	4 0 0	4 0 0
Swinemunde, ".....	5 0 0	5 0 0	4 0 0	4 0 0
Copenhagen, ".....	6 6 0	5 3 0	4 6 0	4 6 0

Similar comparisons might be made with regard to other rates, but the foregoing figures give a sufficiently vivid picture of the existing situation. When it is remembered that about eight-tenths of all the manufactured iron made in the North of England consists of ship-plates, angles, bulbs and other rolled shapes for the shipyards, one need not wonder that the outlook is regarded with considerable apprehension in that part of the country.

Spring Garden Institute.—We have just been favored with the prospectus of the Spring Garden Institute, of Philadelphia, an inspection of which shows that much good work can be done by the methods there adopted, provided sufficient public interest be shown in the matter. The schools are divided into departments, with different hours of meeting, and both day and night classes have been established, the latter being intended for the education of young men and women who have no leisure during the day, and for those who have had no previous instruction. The courses are so graded that, according to the time spent in the school, the pupil is more or less qualified to enter upon industrial work. The course of mechanical instruction with all the classes is progressive, commencing with simple geometrical figures and ending with the finished model, machine or pattern. Competent teachers have been employed to give instruction in the various branches, and the shops are supplied with the best of hand and power tools. The tuition fees, moreover, are exceedingly moderate, and so arranged that a student may discontinue his studies at the end of a quarter without pecuniary loss to himself or to the institute.

SCIENTIFIC AND TECHNICAL.

Modifications of Glass at Moderate Temperatures.

Some interesting communications relative to the changes which thermometers undergo when they are heated for a long time were recently presented to the French Academy. It appears from these that in manufacturing of printers' ink, where oils are heated to a temperature of 270° (538° F.) for many days, the most accurate thermometers often become so changed as to indicate errors of 10 or more degrees. J. Salleron calls attention to similar changes at much lower temperatures. The areometers, which are employed in sugar refineries where molasses is treated by osmosis, are plunged for many days in liquids which are heated to 95° (203° F.). Although this temperature is below the boiling point of water, it is sufficient to completely modify the areometers and to soften the glass enough to make them untrustworthy.

Influence of Heat on the Permanent Magnetism of Steel.

According to the *Chronique Industrielle*, some interesting experiments relating to the influence of heat on the permanent magnetism of steel were recently made by Professor Poloni. He finds that the diminution of magnetic intensity by the increase of temperature in the steel bar has no rigid relation to the increase of electric resistance in the metal itself. While the permanent magnetism diminishes with increasing rapidly up to a temperature of 328° F., and then less rapidly up to 508°, becoming inappreciable at red heat, the electric conductivity of the iron diminishes uniformly with the increase of temperature.

Light Standards.

M. Monnier, director of the laboratory installed at Paris (by the gas companies) for the study of electricity, has undertaken a comparison of the existing standards of light. He finds the value of the French candle to be in English standard candles 8.33; in German candles, 7.5; in Munich candles, 6.5. The standard equivalent values of those in vogue are, for the English, 9.5, and German, 7.6; therefore, some change in this respect would seem to be advisable. Schilling's equivalents to the candle are, English, 9.6; German, 9.8, and Munich, 8.7. On the other hand, Schilling's measurements give the corresponding values as 7.77, 7.4, 8.7.

Deep-Sea Lighthouses.

An English journal gives an account of a plan recently proposed by an English engineer for founding "deep-sea lighthouses." As explained to the London Society of Engineers, this plan proposes the construction of a hollow cylinder of riveted ironwork, 250 feet long, to consist of two sections—the upper part to be 140 feet long, destined to rear its head above the waves and fitted as an ordinary lighthouse, while the remaining portion of the tube is to be ballasted so as to sink below the water-line, and counteract the force of wind and waves on the exposed part. The whole apparatus is to be anchored in deep water by heavy steel cables. The inventor claims that it would be easy to tow such a structure to the spot selected for it, and then, by admitting water to the lower section, it would assume an upright position and ride the waves like a bottle. The practical use which this is intended to serve is to give notice of approaching storms by means of telegraphic connection with the shore. It is believed to be practical to found a floating telegraph station, say 1000 miles from the coast of England in mid-ocean, from which comings of approaching storms could be given long before their arrival.

Photo-Zincography.

In the office of the French Minister of Public Works charts and plans are prepared by a process of photo-zincography. The *Bulletin de la Société d'Encouragement* thus describes it: A plate of commercial zinc is chosen which is free from defects. In order to cleanse thoroughly it is rubbed with a stiff hair brush, which is dipped into a mixture of one-third sulphuric acid and two-thirds water. After this cleansing, which removes every trace of oxidation and grease, the plate becomes very brilliant, and it is rubbed for some minutes with a cork dipped in powdered pumice-stone. It is then washed and plunged, for 10 or 15 minutes, into a bath acidulated with 3 per cent. of nitric acid. The plate then has a dull look and shows a slight roughness under the microscope. After having carefully dried it, it is covered by a preparation composed of 10 liters of water and 500 grams of crushed nut-galls. After boiling this preparation until it is reduced about one-third, it is cooled and filtered through linen; then are added 100 grams of nitric acid and 6 grams of pure chlorhydric acid. After the preparation has been left in contact with the plate for some time, it is washed and dried and then coated with bitumen in the ordinary manner, and exposed to the light under the drawing which is to be copied. When the exposure is over, the plate is warmed slightly and developed with the addition of a liquid containing 5 per cent. of acetic acid. To facilitate the inking, it is well to apply to the lines some oil, which destroys their brilliancy and turns them gray. Then, after a careful drying, the bitumen is dissolved by benzine and the plate is again dried. It can now be delivered to the printer, who submits it to the customary operations of lithography for inking and printing.

Driving Machinery by Sand.

A Western exchange gives an interesting account of the method recently adopted by Mr. J. Townsend, of Virginia City, to run a number of arastras by sand. The arastras

Cutlery.

INFRINGEMENT OF JOHN WILSON'S TRADE MARK, MASSACHUSETTS, U.S.A.

JOHN WILSON'S
BUTCHERS' KNIVES,
BUTCHERS' STEELS,
and
SHOE KNIVES.

TRADE MARK



REGISTERED IN ENGLAND,
WASHINGTON, U.S.A.,
AUSTRALIAN & OTHER
BRITISH COLONIES, &
GERMANY.

ACKNOWLEDGMENT AND AGREEMENT.
"WHEREAS, I, GEORGE A. ROBINSON, of West Mansfield, County of Bristol, State of Massachusetts, have heretofore manufactured and sold certain Knives bearing a Mark which is claimed to be an imitation of the trade-mark owned by John Wilson, of Sheffield, England, which consists of four peppercorns and a diamond, under the mistaken belief that I had the right to do so.
NOW, This, is to Witness, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,
FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and
SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1883.

Witness —
E. M. REED,
(Attorney for Defendant.)

G. A. ROBINSON. (L.S.)

Imitation Mark.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.



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Manufacturer of Razor Strops & Dressing Cases.
Sole Agent for Worcester Cutlery Co.
Importer of Fine Razor Hones.

American Made Razors.
WARRANTED BEST CUTTERS IN THE WORLD.
J. R. TORREY RAZOR CO.
Factories: WORCESTER, MASS.
Send for Price Lists.

SPENCER & UNDERHILL,
94 Chambers Street, New York,

DEPOT FOR

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Also, W. & S. Butcher's Chisels, Plane Irons, &c.

A. Field & Son's Tacks, Brads, Nails, &c.
Brade's Brick Trowels.
G. F. Warner & Co.'s Carriage Clamps.
Nicholson File Co.'s Files.
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Germantown Tool Works' Warranted
Hammers and Hatchets (Stamped)
GENERAL HARDWARE.

Engström's Celebrated Razors.

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Principal Dealers
in Cutlery.



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SOLE AGENTS FOR THE UNITED STATES,

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GEO. H. CREED,
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Manufacturers of and Wholesale Dealers in
Cotton and "Long Flax" Sail Duck,
Cotton and Linen Havens,
Creed's Patent Ships' Crews. Heltman's Wire Rope
Splicers. Agent for Raymond's American Crane Oil
for lubricating Cylinders and Valves.

ONEIDA ALARM TILL.
SUSCEPTIBLE OF OVER 100 CHANGES.

Better than any other Till in the market. No tampering with keys, as it alarms every time a key is touched, unless acquainted with combination. Send for prices and compare this Till with others in the market. No till-tapping possible.

MANUFACTURED BY
THE ONEIDA ALARM TILL CO.,
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OFFICE OF
PHOENIX CASTER CO.,
Indianapolis, Ind.

MARTIN'S CASTER,

For heavy bedsteads, book-cases, flower stands, refrigerators, safes, sideboards, desks, or very heavy furniture. Also for heavy ice chests, magazine boxes, stove trucks, heavy showcases, beer boxes, or any very heavy weight. Especially adapted for use in beer bottling, fruit canning, tobacco or warehouse establishments, where heavily-loaded tables need to be moved.

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Our Drawers are so uniform, simple, strong and effective, that it has nearly driven all competition from the market.



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CORPORATE MARK



Joseph Rodgers & Sons'
(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York

F. & W. CLATWORTHY, Agents,

The demand for **Joseph Rodgers' & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam-power.
To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

ESTABLISHED 1836.

ALFRED FIELD & CO.,
93 Chambers and 75 Reade Streets,
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SOLE AGENTS FOR

Ely Bros., Caps, Wads, &c.,

Joseph Elliot & Sons, Razors.

Isaac Greaves, Sheep Shears, &c.,

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Cutlery.

SHEARS
AND
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J. WISS & SONS,

MANUFACTURERS OF ONLY BEST QUALITY

TAILOR SHEARS,

Straight and Bent Trimmers,

BARBER SHEARS, TINNER'S SNIPS,

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THREE PRIZE MEDALS.



MATTHIAS SPENCER & SONS,

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STEEL,

Table Knives, Razors, Shovels, &c., &c.,

of every description.

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SPENCER**SHEFFIELD**

Granted 1749.

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Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers, 3 Sizes.

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NEW pattern Heavy Screw Clamps;

strongest in the market.

For sale by all the principal Hardware dealers.

Send for Price List.

Malleable Iron Castings

Of superior quality and Hardware Specialties in

Malleable Iron made to order.

HAMMER & CO.,

BRANFORD, CONN.

Hammer's Malleable Iron Oilers, 3 Sizes.

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NEW pattern Heavy Screw Clamps;

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Established in 1839.

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Successors to

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THE GENUINE

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The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

None genuine unless stamped

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Our Agents, GRAHAM & HAINES, 112 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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PRICE OF INSTRUMENT COMPLETE, \$20.

Adapted to the use of Architects, Engineers, Masons, Builders, Farmers and others.

This instrument is made of Brass and Iron, furnished with both masons' (short metal) and surveyors' tripod, and put up in a handsome wooden box, with strap. The only low-priced Level that can be thoroughly adjusted in the field.

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This rod is round and made in two sections; it is united by a solid screw joint, as if of one length, and has a target. There are two scales, one side being Engineers' (feet, inches and tenths) the other Architects' scale (or, feet, inches and eighths). Price, \$6.

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Circulars and discount to hardware trade furnished to dealers sending their card.

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WIRE BENDING A SPECIALTY.

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American and English Goods, Fishing Tackle, Winchester and Other American Rifles.

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Complete Outfits for Workshop Business.

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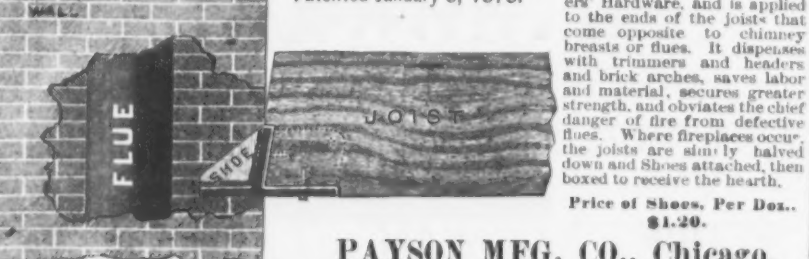
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Iron Shoes for Flue Joists.

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This is a new article of Builders' Hardware, and is applied to the ends of the joists that come opposite to chimney breasts or flues. It dispenses with trimmers and headers and brick arches, saves labor and material, secures greater strength, and obviates the chief danger of fire from defective flues. Where fireplaces occur, the joists are simply halved down and shoes attached, then boxed to receive the hearth.

Price of Shoes, Per Doz., \$1.25.

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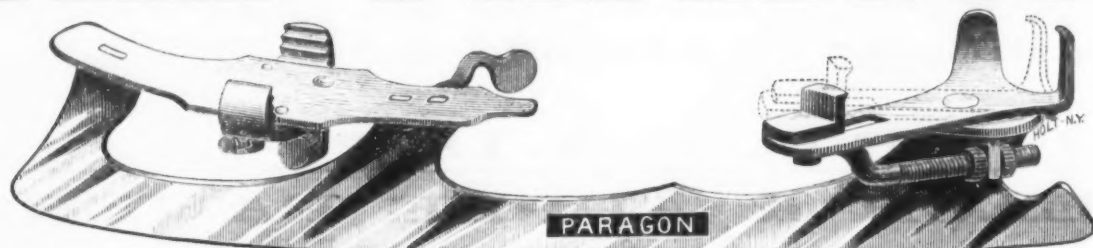
HALL & ELTON'S GERMAN SILVER.



In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

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THE PARAGON.



The Most Perfect ALL CLAMP LEVER SKATE Ever Made. NO TROUBLE IN ADJUSTING.

NEAT, SIMPLE, POWERFUL AND EFFECTIVE.

In its general use at the leading Rinks and Skating Lakes last season, it invariably received the highest testimonials of favor. Yet, notwithstanding these, we have improved some points, so there cannot now be a question as to its great superiority.

WE ALSO MAKE A COMPLETE LINE OF ALL OTHER KINDS OF SKATES

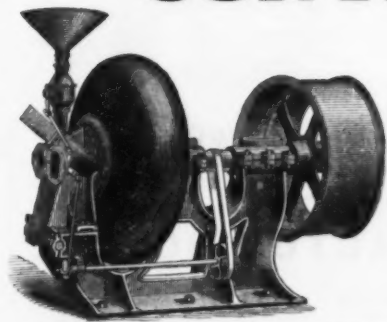
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DU'S Mechanical ATOMIZER Or Pulverizer.

For reducing to an impalpable powder all kinds of hard and brittle substances, such as QUARTZ, EMERY, CORUNDUM, GOLD AND SILVER ORES, BARYTES, COAL, OCHRE, MANGANESE IRON ORES.

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It is simple and not liable to get out of order. Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight, 5,500 lbs. heaviest piece, 1,500 lbs. It will pulverize 7 to 10 TONS IN 10 HOURS with 30 H. P.

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THE PEACOCK PATENT "SCREWLESS" DOOR KNOBS AND SPINDLES.

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BRANCH OFFICES:

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PHILADELPHIA, 507 Market Street,
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are placed in a light sandy field where only sufficient water for drinking purposes and to moisten the ore to be operated upon can be obtained. The sand drives a large overshot wheel, taking the place of water. It was at first Mr. Townsend's intention to run the arastras by means of a large windmill, but as the speed was naturally irregular he adopted the present method. The windmill now runs a belt containing a number of buckets, and these carry sand up to a large tank somewhat in the way that grain elevators carry wheat. A stream of sand being let out upon the overshot wheel causes it to revolve, just as it would under the weight of a stream of water, and thus far the method is said to have been found very successful. When there is a considerable wind, sand is stored up for use when calms prevail, and in this manner the mills may run continuously.

Sheffield Cutlery Trade-Marks.

The Sheffield Telegraph of August 25 says: Last night the finishing touch was put to the Government Patents, Designs and Trade-marks bill by the Commons to the Lords' amendments made in them. The bill now awaits the Queen's assent, which will probably be received before prorogation. Of course, this bill affects Sheffield from a general point of view, inasmuch as the town has a peculiar interest in any legislation on the subject of patents, designs, trade-marks and the like; but it possesses still greater interest for the town, inasmuch as by the bill a complete change will be found to have taken place in the manner of the granting of what have been usually known as corporate marks by the Cutlers' Company of Sheffield. To make the matter clear, it is necessary to give a short resumé of what has led to the change which is about to take place in the Cutlers' Company's procedure. It will be within the knowledge of our readers that in the Trade-Marks Registration act of 1875 (which, speaking briefly, compelled the registration of all trade-marks), there was inserted a clause, with sub-sections, saving the rights and privileges of the Cutlers' Company in what was considered at the time to be as full and complete a manner as possible. This clause was inserted in the act mainly through the instrumentality of Mr. Mundella, and that at the last moment of its passing, the bill having been considered during the last hours of the session of 1875. After the 1st of January following applications for the registration of trade-marks generally began to pour into the London Registry, and many Sheffield manufacturers, and those who held Sheffield Cutlers' Company's marks, registered them in London in order to obtain what was considered by them to be the more complete protection offered by the Imperial Registry. The result of this was that in or about the year 1879, the Registrar of Trade-Marks in London began to object to the Cutlers' Company dealing with any mark here which had been registered in London, and after considerable correspondence and negotiation it was agreed, on the side both of the Commissioners of Patents in London and the Cutlers' Company in Sheffield, that the saving clause of the act of 1875 was altogether inelastic, and that it would really preserve the rights of the Cutlers' Company, and would have the effect of destroying their rights as a mark-granting corporation in process of time. The attention of the Cutlers' Company having been called to the difficulties which had arisen, they, toward the end of the year 1880, requested their law clerk to prepare a statement which might be laid before them, showing how the matter really stood, and at a meeting of the company, held on the 20th of December, 1880, the law clerk (Mr. Chas. Macro Wilson) laid a written statement before the company as to the difficulty which had arisen between the Registrar of Trade-Marks in London and the Cutlers' Company in Sheffield in carrying out the Trade-Mark Registration act of 1875. The company were of opinion that the statement was a very clear exposition of the state of the case, and they ordered it to be printed and a copy sent to each member, together with one of the trade-marks act, which was accordingly done.

As soon as the real difficulties had been formulated between the Registrar of Trade-Marks and the Cutlers' Company, the company brought the matter under the notice of Mr. Mundella, who at once stated that it was the intention of the Government on passing the Trade-Marks Registration act, 1875, to preserve the rights of the Cutlers' Company, and that any further legislation that was required to attain that object he would use all the influence of his position to bring about. At first it was intended to have an amendment act to the act of 1875, which should be called the "Trade-Marks Registration Amendment act." The Cutlers' Company and the Government draftsman, Sir Henry Thwing, were appointed to draw up a bill, which was eventually done. Time did not admit of its being brought in during the session of 1881, and it therefore stood over until the next session. In January, 1882, the Registrar of Trade-Marks communicated to the Cutlers' Company the intention of the Government to bring in an act amending the Trade-Marks Registration act in many particulars, and which act was at that time intended to be a trade-marks act only, and the Cutlers' Company's clauses we have under notice were inserted in the draft act, but all will remember the disastrous session, which, so far as general legislation went, was a blank, everything having to give way to the settlement of Irish affairs, the result being that no bills were introduced in the session of 1882.

In January, 1883, the Registrar again approached the Cutlers' Company, and informed them that the Government intended to deal with the whole question of trade-marks, and, after full negotiation and interviews with Mr. Chamberlain, during which Mr. Mundella amply redeemed his promise to support in every way and by every means in his power the Cutlers' Company, and clauses relating to the Cutlers' Company in the act under notice were inserted. This bill, as we have stated, has now probably received Her Majesty's assent, and the principal changes which it will bring about in the Cutlers' Company's procedure are as follows: The company are to establish a new registry of trade marks, which will always be known,

both legally and, we expect, locally, as "The Sheffield Register." At the present time there has been considerable doubt as to what goods are comprised in the Cutlers' Company's acts, and considerable discussion has taken place between the Board of Trade, the Registrar of Trade-Marks and the Cutlers' Company as to what goods should be included in the new act, but eventually it was deemed advisable, in the interests of manufacturers and others in the district of Hallamshire, that the goods as to which registration in the Sheffield Registry is to take place should be as comprehensive as possible of what are known as the Sheffield trades. It is intended by the new act that the Cutlers' Company are to enter in their Sheffield Register all trade-marks used upon cutlery, edge-tools, or raw steel, or on goods made of steel, or of steel and iron combined, whether with or without a cutting edge. There is no doubt but that this enactment will be productive of considerable advantage to Sheffield manufacturers, because they will now be able to obtain comprehensive registration in Sheffield, whereas it has always been doubtful hitherto whether, as regards articles not having a cutting edge, they ought not to register in London as well as in Sheffield.

Application for the registration of trade-marks used upon the goods we have referred to have for the future to be made to the Cutlers' Company, and precisely the same incidents will occur in the registration with the Cutlers' Company, as occur in the registry of the Imperial Registry; that is to say, that for the future all applications made in the Sheffield districts for marks will have to be advertised in the Official Trade-Marks Journal for a period of three months before they are granted, and it is arranged, we understand, that the rules will provide for the selling of the Trade-Marks Journal in Sheffield. The effect of this publicity, with regard to applications, will, we are assured, be much valued by manufacturers in this district and neighborhood. All applications in Sheffield have to be notified to the Registrar in London, and all applications in London for marks used upon goods coming under the Cutlers' Company's new jurisdiction have to be notified to the Cutlers' Company. At the expiration of five years from the commencement of the new act, the Cutlers' Company will have to close the present register of corporate marks, and all the marks not entered in the new register will be deemed to be abandoned. It is believed that it is the intention of the Cutlers' Company to bring this provision before the public by advertisement at intervals during the five years, so that no person will be aggrieved by the closing of the existing register of corporate marks.

Another great improvement is that for the future a person will be entitled to be registered in the Sheffield Registry in respect of any number of marks, whereas at the present time only one corporate mark can be granted to one person. Another provision, which is a great advantage in these times of limited companies, is that any body of persons, corporate or not corporate, may, notwithstanding the provisions of the Cutlers' Company's act, be registered in the new Sheffield Registry as proprietor of a trade-mark or trade-marks. And not only appeal is given to anybody aggrieved by the Cutlers' Company to the Registrar of Trade-Marks, who is from henceforth called the Controller of Trade-Marks—and the Controller of Trade-Marks has power to affirm, reverse or modify—but there is also power given to appeal to the Court of Chancery from the decision of the controller. The valuable existing law, which enables summary proceedings to be taken in Sheffield under the Cutlers' Company's act in case of infringement of marks in Sheffield, is expressly applied to the new register, and will apply to marks contained in it in precisely the same manner as now applies to corporate marks.

These, then, are the principal alterations which have taken place, and it will be seen at a glance that they modernize the proceedings of the Cutlers' Company, and bring that institution in harmony with the requirements of the present day. This has been the object throughout of the Cutlers' Company, as it was felt that many of the antiquated provisions of the Cutlers' Company's acts were entirely out of harmony with the requirements of the present day, and they, therefore, seized the opportunity which the negotiations with the Government offered to do away with the provisions which have much impaired the usefulness of the company as a mark-granting corporation. Both of the borough members have been assiduous throughout in their endeavor to promote the wishes of the Cutlers' Company, and of the inhabitants of the district of Hallamshire generally, with regard to this act, but there is no doubt that it is chiefly owing to the influence and position of Mr. Mundella that the successful issue to which the matter has been brought is due, as, notwithstanding some tendency to show that to consider the Cutlers' Company of Sheffield and its granting of marks as a thing of the past, Mr. Mundella throughout has maintained that it is a useful institution, and he not only expressed his opinion that it ought to be preserved, but has endeavored, and successfully, to preserve it. Although the act is by the 3d section to commence immediately after the 31st of December, 1883, still, as the rules upon which all the details depend are to be upon the tables of the Houses of Parliament while in session for forty days, it would not appear as if the act could actually come in force until about the middle of April. Of course, many of the rules would affect the Cutlers' Company, and therefore the matter can hardly be considered at an end, as much careful consideration will have to be given to the rules by the Cutlers' Company when they are drafted. Having regard, however, to the good feeling which has been shown to the Cutlers' Company by the Government, we do not suppose there will be any real difficulty upon this head.

The King of Siam is buying trade dollars in Singapore and Hong Kong at 90 cents on the dollar, and converting them into new Siamese ticals. The ticals are current at 60 cents in any part of the Kingdom, and it is said one trade dollar will produce two ticals. In Singapore and Calcutta the tical is valued at 42 cents.

H. D. SMITH & CO.,

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Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE,

Manufacture the Largest Variety of Forge Carriage Irons, of Best Material and Workmanship.

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SPRING CALIPERS AND DIVIDERS.

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Is the favorite everywhere.
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Spring Screw Caliper for Calipering screws & Taps.

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For Cutting Round and Flat Bar Iron and Sheet Metal.
MADE ENTIRELY OF CAST STEEL.
Cheapest and best tool for the purpose ever put on the market.
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MASTER-KEYED BRASS PADLOCKS, in sets of any required number, made to order. Each lock has 2 special keys, which will unlock no other. Each Set has a Master-Key which will open the whole set—a great convenience in all shops and factories. Thousands in use. Satisfaction invariably given.

All who use **PADLOCKS FOR SECURITY** should examine "Miller's G-Lever," of which there are now made nearly 20 modifications. The Franklin Institute has awarded to the inventor the John Scott Medal and Premium, for account of the Board of City Trusts of the City of Philadelphia.


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Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.
With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.




The Farrel Foundry and Machine Co.
ANSONIA, CONN.,
Manufacture Improved

ROCK & ORE BREAKERS,
(THE "BLAKE" STYLE)

designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores; also, Stone for making Concrete and Railroad Ballast.

Twenty years of practical test, at Home and Abroad, has proven this machine to be the best on ever invented for the purpose. Mr. S. L. BLAKE, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable time. Gold Medal awarded at the Massachusetts Mechanic Association, 1881, and Silver Medal (special) at American Institute, New York, 1882.

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IRON ROOFING.
Extra quality. Best plan in use. (Sold as low as any other)

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Cheap, strong and durable. Does not get out of repair. Every roof sold in even years satisfactory. Any mechanic can apply it. Circular and sample free.
Also manufacturers of the best and cheapest Metallic Paint in use.



PEACH & APPLE PARERS.

Scott's "Rotary Knife" PEACH AND APPLE PARER.

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The Only Parer with a Quick Return.

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ALSO MANUFACTURERS OF
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The Only Successful Peach Parer.
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WE GUARANTEE ALL NAILS SUPERIOR IN QUALITY.

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FOR STEAM AND WATER.

Is made entirely of metal occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by Curtis Regulator Co., 61 Beverly St., Boston, Mass.


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Manufacturers of Copper, Brass and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk, Clout and Cigar Box Nails, &c. Rivets made to order.

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Designed for mining purposes and the utilization of water power with limited quantity of water and high heads. Being placed on horizontal shaft the power is transmitted direct to shafting by belts. For further information and free illustrated catalogue, address

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DRAWER AND WINDOW KNOBS, SCREW KNOBS, TOWEL RACKS, &c.

Pat. March 26, 1872.

July 27, 1880.

Full Size. HALF SIZE.

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Leading Jobbers throughout the United States at Manufacturers' Prices.

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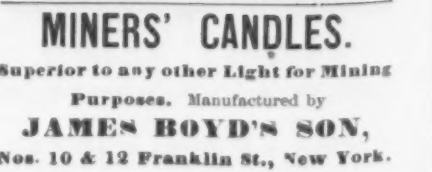



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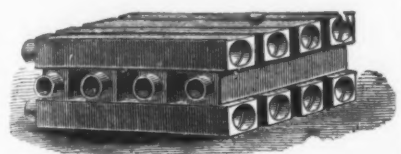
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Superior to any other Light for Mining Purposes. Manufactured by
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ESTABLISHED 1839.

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MALLETS,

Hawking Beetles, Hawking and Calking Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles, Also

COTTON AND BALE HOOKS,

Patented Feb. 13, 1877; a new combination of Hooks.

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Builders' Hardware,

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Machine Belting,
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Steam Hose,
Piston Rod Packing,
Gaskets and Rings,



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Ball Valves,
Car Springs,
Wagon Springs,
Gas Tubing,
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Billiard Cushions,
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This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than twelve years, also those for the great Elevators of the Penna. and Erie Railroads, of Jersey City and Hoboken, Dow's Stores, of Brooklyn, and many others; in fact, the largest Belts for the largest Elevators in the world.

A single carrier belt in the Penna. R. R. Elevator is over 200 feet long, weighing 18,000 pounds, and has run perfectly from the start.

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"TEST" HOSE.

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Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

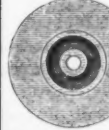
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Emery Wheel.

Solid Vulcanite EMERY WHEELS

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.



Section of Emery Wheel showing Iron Center.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

Pat. Jan. 24, 1869.



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For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

B represents that part of the packing which, when in use, is in contact with the piston rod.

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This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

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For Halls, Flooring, Stone and

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Iron Manufacture in Maryland and Pennsylvania in 1734.

Under the above head the *Bulletin*, of September 5, prints a letter from Mr. W. F. Durfee, announcing that in the course of an examination of Emanuel Swedenborg's "Regnum Minerale," the writer found a brief account relative to the smelting of iron in Maryland and Pennsylvania. We quote as follows from the translations submitted:

There are a few furnaces for smelting ores of iron, and some works for reworking the crude metal, not long since erected; particularly works called Principio, in the upper part of the Province of Maryland, upon the banks of the River Principio (whence their name is derived), where it is said the water falls from a height of 25 feet. To these iron works two-oared boats and small vessels bring loads of iron ore, which is mined at a place 50 miles distant. The ore is described as of a grayish color, not unlike the potter's ware of Holland, of itself nearly half the strength of iron. It is claimed that the iron made from this ore is of very superior quality.

About nine years before the administration of the Province by Sir William Keith, iron was smelted at a works on the banks of the River Christian, which are now destroyed. They were for the first two years of their existence distinguished for the abundance and satisfactory quality of the iron turned out, but during the third year, because of a lack of ore, they were abandoned. It is asserted that iron ore is very abundant in that region, but that it is refractory, and without limestone as a flux (of which there is little to be had) cannot be smelted. At the distance of one mile from that place there is another smelting furnace erected, but it is said that, on account of the exceeding dryness of the ore and scarcity of limestone (and not their construction), smelting is difficult; but it is also stated that the difficulty is caused by smelting the ore by itself in hearths and attempting to make either blacksmiths' bars or reworked crude iron. In the neighborhood, on the River Huileer, are similar small works dedicated to St. James and owned by Mr. John Ball, where ore is smelted and the iron reworked and hammered into bars; this work has but one hearth. Another larger works, erected on the River Schuykill, by Mr. Samuel Nuts, has a smelting furnace and a hearth for the production of blacksmiths' iron. Another works, about six miles distant, near the banks of the same river, is owned by Mr. M. Rutter. Near by, in the vicinity of the River Delaware, are two of the same kind of works, whence it is said large amounts of crude iron were sent to England; their product was equal to that of the furnace Principio before named. There are a number of other works called Bloomeries, where rough bars are made from the ore; at this time it is said there are five in the vicinity of the Delaware River, and thus far four more are contemplated.

The Crude Method of Smelting.—It is customary to prepare the ore by first laying it upon a pile of wood mixed with charcoal, which is lighted at many points and burns the ore nearly to melting. This calcined ore is broken into pieces about the size of a hen's egg; it is then taken in peck baskets (as they are called), raised to the upper part of the furnace and thrown upon it. Every two hours 18 measures of ore (each containing two pecks) are, as we are told, placed upon 24 well-shaken bushels of charcoal, and either limestone or pieces of oyster or other shells are added, and the next thing required of the furnace is to smelt the ore into small bars. Smelting continues throughout the 24 hours, and three times daily there are tapped out 15 cwt. of crude iron, or 45 cwt. during the day and night. The melted metal is tapped out into sand and run into moderate-sized masses, which are called "pigs," or even cast into three-legged pots and other kitchen utensils. It is sometimes customary when utensils are to be made to melt the little bars (pigs) in a hearth which is emptied by a ladle. These smelting furnaces are 25 feet in extreme height; their longest bellows are 5 feet in width, and the opening through which the charcoal and ore are introduced is of an oblong figure whose greatest length is about 4 feet.

Reworked Crude Iron.—This is made in the iron works out of "pigs" or larger masses of iron, and during the day and night by diligent labor 1 English ton of iron is produced, which is equal to 7 1/2 Swedish nautical weight, or 2000 of the smaller weight before named. The value of 1 ton of this reworked iron in that region is £35 sterling, and it is said that 1 ton of crude iron is worth about £9 or £10.

Smelting Ore and Making Bars Directly Therefrom in Works called Bloomeries.—Three pecks or 1 bushel of previously calcined ore, crushed to the size of nuts or acorns, is passed through the fire of a hearth, and in four hours 60 or 70 pounds of iron can be taken from the bottom of the fire and drawn into small bars or rods, which are tied up like bundles of twigs. The weight of the hammer used is 336 pounds. The ore (which is of a dry nature) is brought from widely-scattered places at great expense, and large wages must be paid those who procure it, and to those who furnish the wood and charcoal, as well as to those who work the fires, and also to a multitude of apprentices and laborers.

The Stevens Institute of Technology.—The twelfth annual catalogue of the Stevens Institute of Technology, which was issued a short time since, has come to hand, and, as usual, contains much interesting matter pertaining to the studies pursued, the available facilities, and the improvements and additions made during the past year. Among the latter we may class the department of applied electricity, in which it is intended to supplement the theoretical knowledge acquired by systematic laboratory instruction, and it is beyond doubt that the undertaking will be productive of excellent results. The subject of mechanical engineering, including theory and practice in the construction of machines, forms a distinct department, and in connection with the mechanical laboratory offers unusual advantages to the student. Probably the most distinctive feature characterizing the work of the institute during the past two or three years is found in the course of practical

training, combining shop practice and experimental mechanics, which aims to co-operate with the departments of engineering, mechanics and drawing, so as to bear to them the same relations as the physical and chemical laboratories do to the class-room work in physics and chemistry. Within the past few years considerable improvements have been made in this direction, and the workshop, together with machinery now at the command of the institute, are such as to enable thorough instruction in this department.

New Rules for Investigating Steamboat Disasters.

The following circular letter, which embodies the recommendations of the Supervising Inspector-General of Steam Vessels, to which emphasis has been given by the recent explosion of the steamer Riverdale, has been issued to supervising inspectors of steam vessels:

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., September 3, 1883.

To the United States Supervising Inspectors of Steam Vessels:

GENTLEMEN—In view of well-grounded complaints of the impropriety of local inspectors investigating disasters to the hulls and boilers of steam vessels after certification by themselves that such hulls or boilers are safe, you are hereby directed, whenever accidents occur to steam vessels through alleged defects to either hull or boiler, to conduct such investigation personally under the authority conferred by Section 4409 of the Revised Statutes of the United States, as follows:

"Each supervising inspector shall have full power * * * * in any district where from distance or other cause it is inconvenient to resort to the local board, to inspect any steam vessel, and the boilers of such steamer, and to grant certificates of approval, and to perform all the duties imposed upon local boards."

Section 4409 Revised Statutes requires that if the supervising inspector has good reason to believe that there has been, through negligence or other cause, a failure of the board which inspected the vessel to do its duty, he shall report the facts in writing to the Secretary of the Treasury.

The question of supervising inspectors assuming original jurisdiction in investigating the conduct of licensed officers of steam vessels and revoking and suspending licenses of such officers, independent of the provisions of Sections 4450, 4452, Revised Statutes, were submitted to the Solicitor of the Treasury by the Supervising Inspector-General of Steam Vessels, August 8, 1881, and on August 27 following, the Solicitor rendered an opinion in writing (copy inclosed) affirming the proposition.

You will be governed by the terms of this circular letter in the case of accidents to steamers such as referred to herein, in all cases where such accidents are to be investigated within the jurisdiction of the local board of inspectors who inspected and certified the steamer. Very respectfully,

Jno. C. New, Acting Secretary.

Wages of Ironworkers in Germany.

—Mr. Robert P. Porter, in a letter to the *Tribune* from Berlin, says: I have obtained here in Berlin some interesting facts and figures showing the present prosperous condition of German industry, and which, in a manner not to be mistaken, prove the fact that wages in different classes of industry have an upward tendency. First comes the Board of the Northwestern Group of the Association of Iron and Steel Manufacturers, with a report recently published, showing that at 46 works the number of hands employed had increased 8 per cent. during the year ending in 1882. On the average wages for the year 58 works sent in reports; at two works it fell off—by .45 per cent. at the one, by 6.97 per cent. at the other; it got higher at 49 works, and remained stationary at 7 works. At 25 works it went up to 5 per cent.; at 15, up to 10 per cent.; at 3, to 15 per cent.; at 6, to 18.88 per cent. On an annual average, 140 workmen earned \$120 at a minimum, but the fact is in this instance specially mentioned that they carry on farming as a secondary business. Furthermore, on a yearly average, 5227 workmen earned from \$150 to \$200; 32,738, from \$200 to \$250; 17,606, from \$250 to \$300, and 738 over \$300. After a careful analysis of these figures the report concludes in the following words: "We think we are, therefore, entirely entitled to assert that also in the past year the condition of working people has again improved, for there was more work and the work was more remunerative."

The English parcels post, which went into operation August 1, gives to Great Britain the facilities for sending small packages which this country has long had in the service of its express companies. The limit of weight which the law establishes is 7 pounds. There are also limits of dimensions to be observed. Packages are considered mailable when not more than 3 feet 6 inches in length, nor more than 6 feet when length and girth are measured. The package has to be handed in at the Post Office, and, if correct as to weight and bulk, has stamps affixed, and goes on its way at a charge of 3d. for 1 pound, 6d. for 3 pounds, 9d. for 5 pounds, and the maximum of 1/ for 7 pounds. In forwarding books the new parcels post works advantageously to the sender, the postage being 4d. a pound, and the parcel may be sealed. Under the former rules of the book post a 3-pound book cost 1/ to forward—now it is 6d. Great speed is not guaranteed, but the time it takes for parcels to reach their destinations will be but little longer than for usual postal matter.

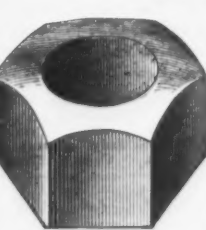
Reports from Allentown, Pa., announce that suit has been brought against the Bethlehem Iron Company by a large number of former employees to recover the amounts deducted from the wages at the end of each month in payment of bills incurred at the company's store. Judgment has been rendered against the company in two cases for more than \$300. The total amount involved is said to be very large, and the question is one which concerns other corporations in the State.

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The Iron Age

AND
Metallurgical Review.

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The Condition of the Iron Trade.

Although there are bright spots here and there in the iron trade, which mark the existence of fair demand and prices enough above cost to leave a slight profit, the general condition is one of dullness and very unsatisfactory returns. The feeling of hopefulness which has for some time characterized the utterances of those interested in the business of manufacturing or selling iron and steel appears to be undergoing a change, and there is more talk of reducing cost, getting wages on a lower level, forcing the price of raw material to a cheaper rate, restriction of production, &c. There appears to be no cutting of rates in this part of the country, and the demand, though limited, is constant; yet the impression naturally prevails that this state of affairs cannot always continue, and, as hopes of a greater volume of trade are not being realized from day to day, there is a tendency to look on the other side and to speculate on the changes which may follow if prices are reduced.

The effort to get the cost of production on a lower plane is always accompanied with disagreeable circumstances, and it would be well if it could be avoided; but a period of activity and remunerative prices is invariably followed by a period of stagnation and profitless trade, at which time wages must be reduced and the receipts of those who furnish raw material must be proportionately curtailed. It may be that the beginning of a long, dull, unsatisfactory season is not upon us now, but the indications favor such an assumption. It is true that a great deal of iron and steel is being manufactured and is going into consumption—possibly within 10 or 15 per cent. of the quantity consumed a year ago—but this falling off in the consumption is the cause of the comparative stagnation which exists to-day. It would require but a slight increase in the demand to change this condition of dullness into one of great activity, and restore prices to the point of profit where they should be, but there is no prophet who can point out whence this increased demand is to come. Therefore, the condition of expectancy referred to in these columns last week still continues, with a tendency now to discouragement.

A sample of the kind of nonsense to which the Senate Labor Committee is compelled to listen was furnished by Mr. W. G. Moody, who formulated his views as follows: "I would fix a penalty upon any corporation or persons who would try to make a man work longer than six hours. No one

"should have the right to labor longer than this time. The result would be greater comfort to the employee and to society generally, because it would afford a means of assuring employment to those unemployed." It might be interesting to ask where double the number of workers would come from, and, if they could be found, how they would like to live on six-hour wages.

Opening the Northwest.

The completion of the Northern Pacific Railroad—extending from Duluth, at the western extremity of Lake Superior, to Portland, Ore., and to Tacoma, on Puget Sound—reminds every intelligent observer of the grand possibilities of the Northwest. Lying almost contiguous to the British Possessions and parallel to the boundary line, and opening another transcontinental route through regions hitherto comparatively unknown, but abounding in natural resources, the opening of the Northern Pacific line is a happening of unusual significance. Extending westward from Duluth, at the head of Lake Superior, this line runs for many miles through the almost unbroken forests of valuable timber that cover so large an area of Northern Minnesota. Then it passes through the lake region and enters the fertile valley of the Red River of the North. Crossing that stream at Fargo, the plains of Dakota are reached. These are valuable agricultural lands as far west as the Missouri River, which is crossed at Bismarck. Beyond are the so-called "Bad Lands," a country bad by name rather than by nature, consisting of curiously broken and upheaved hills and "buttes" and narrow valleys. Most of the area is covered with bunch grass, and forms admirable pasture land. Through Montana, a high table land is traversed. The ground is also covered with bunch grass, and affords excellent grazing for cattle and sheep. Along the river bottoms agriculture is successfully pursued, although irrigation is usually necessary. In Central Montana the Rocky Mountains are reached, and on to the Idaho boundary the road passes among mountains rich in silver and copper, and valleys of fertile farming land. Running northwest, through the Flat-head country, the boundary of Idaho is reached only a few miles south of the British Colony of Columbia, and the territory is crossed at its narrowest part, a region heavily timbered, as is also the western part of Montana. Then the road turns sharply to the southwest and crosses the Great Plateau of Eastern Washington Territory to the Columbia River. This is a high, grassy plain, containing exceedingly fertile wheat lands, and extends south into Oregon and west to the Cascade Mountains. Then the road follows the Columbia River, skirting Northern Oregon, to Portland, whence the Pacific Division runs northward to Tacoma, on Puget Sound.

This great enterprise, through which vast grain-growing territories will have direct communication with the Pacific and the Great Lakes, was commenced 13 years ago, but the work was interrupted by the panic of 1873 and consequent bankruptcy of Jay Cooke & Co., who had assumed its financial direction. In the year 1881 Mr. Henry Villard obtained control, raised the needed capital of \$5,000,000 on no other security than his own personal pledge, and on Saturday, the 8th inst., the last spike was driven. There are on the line two tunnels, each approaching 4000 feet in length, and two great bridges, one across the Missouri River at Bismarck and another across Snake River at Ainsworth, in Washington Territory, both built of stone, iron and steel. The Yellowstone is crossed three times, the Upper Missouri once, and Clark's Fork of the Columbia three times. There are two pile bridges, each a mile long, across arms of Lake Pend d'Oreille, and a trestle in Marent Gulch, in the Corracan Defile, 226 feet high. The country has few better examples of indomitable enterprise than are afforded in the completion of the new steam highway across the Continent.

Our remarks in last week's issue, on the danger to be apprehended from the shifting of responsibility from the owners of steamboats to the United States Government, are emphasized by the condition of the Riverdale's boilers as shown by inspection after she was raised. The weakness of the exploded port boiler was evident at a glance. The bottoms of both boilers were badly corroded, and the condition of the one which did not explode is so bad that it is a wonder it did not give out long ago. The boilers have been repeatedly patched in places, and that their unsafe condition was perfectly well known to the owners and officers of the boat was evident. A proper inspection by a competent and faithful inspector would have revealed their condition. The probabilities are that the inspections they received were of the perfunctory kind, and that the certificates so conspicuously displayed in the Riverdale's cabin, attesting her satisfactory condition and accrediting her owners with full compliance with the law, were granted on the assurance of the engineer that everything was all right. Now it would be difficult to show what possible use such inspections have. It would also be difficult to show how the present system can be improved. If the law were so framed that those who are responsible for the Riverdale disaster could be sent to the penitentiary for a term of years, it would accomplish the desired purpose with much greater certainty,

even though all the inspectors were discharged and all regulations rescinded. So long as the law prescribes certain things, and the United States inspectors certify that all the provisions of the law have been complied with, it will be easy for those who have unsafe boats to continue in the business.

The "Truck" System.

There are now in progress in Pennsylvania a number of suits brought by workmen against employers to recover arrears of wages alleged to be due. The basis of these suits is found in the fact that during the time covered by their complaints they received in money only a part of the wages due them. In lieu of the balance they took merchandise of one kind or another from their employers' stores. Now they seek to recover at law this balance in money, doubtless on the ground that, as the so-called "truck" has been eaten or worn out, it is of no more use to them, while the money they did not receive would come very handy. In other words, having eaten their cake they cry for it, and have asked the courts to help them get it again. The appearance of these suits attracts fresh attention to the so-called "truck" system which exists in connection with many of the iron works and coal mines in Pennsylvania. In that State it is not lawful for employers to pay their workmen in store orders, and therefore another but equally effective method is used by such firms or companies as desire to make a profit by the sale of general merchandise to their employees. Workmen are given credit at the employers' stores as soon as they begin to earn wages, and pass-books are furnished those who apply for them. The fact that a firm or company is openly interested in a store is undoubtedly in itself a strong hint to workmen that their patronage would be desirable. In case of large corporations no further hint is needed. The workmen generally make their purchases at the "company's store," believing that those who do so are more likely to get steady employment than those who do not. No coercion is attempted and none is needed. Those workmen who choose to go elsewhere are not interfered with. Those who do patronize the store are properly treated, they get their goods as cheap as they could be obtained elsewhere, and they usually have a greater variety from which to make their selections. At the end of the month those who have not bought anything from the company's store receive their wages in cash, and those who have used pass-books receive the cash balance due them, if there is any balance. In case of small firms, especially small coal companies, there is usually some pressure exerted upon the workmen to secure their patronage for the store. It may be by hints, by persuasion, or by an early discharge of the non-customers. There are frequent complaints in the Pennsylvania press of extortionate prices demanded for goods by these small concerns, and there is perhaps good ground for these complaints. The opportunity for rapid money-making is too tempting to a small soul to be let slip.

There are good reasons both for and against this system, independent of the adverse argument arising from the abuses above referred to. Many workmen have no accumulation of funds to depend on, and as soon as they get employment in a new locality they must get credit at once for the necessities of life. They could not get credit from a strange storekeeper. For such people the "truck" system is not only a convenience, but a necessity. In times of business depression the store is often the great bulwark of the manufacturer. It enables him to manage his business with a small amount of cash, and therefore helps him to keep his works going and his people employed until better times set in. On the other hand, the use of a pass-book begets extravagant habits among workmen, as it would among any class of men, and more money is used in the course of a month than ordinary frugality would warrant or permit if cash were handled at each transaction. We have no sympathy, however, with the sentimental objections to the "truck" system on the ground of interference with a man's right to buy where he pleases, and consequently a restriction of his freedom. The condition of true freedom is only attained through frugality, and the economical worker is always, in the long run, master of the situation. He has his future largely in his own keeping. So has his extravagant and improvident fellow-workman, who buys indiscriminately and recklessly, but never saves any money, cannot get ahead, thinks he has been imposed on, and then employs a lawyer to protect him from paying for what he has eaten, drunk and worn.

Shipbuilding in some of its chief characteristics is a very different art from what it was only a few years ago. The substitution, first, of iron for wood, and, secondarily, of steel for both wood and iron, will soon have effected an entire revolution. Canada, next after Maine, was the stronghold of wooden shipbuilding, but a feeling bordering on consternation has been caused in the Dominion by the announcement that a firm who for many years have been among the largest owners of sailing ships in America, building most of their vessels in St. John and vicinity, have just closed a contract in England for a sailing ship of 1500 tons, to be built of iron. Wooden shipbuilding in Canada for several years has been a de-

clining industry, and this last movement is regarded as a presage of its well-nigh final extinction. The so-called "soft-wood" ships of the Canadian Provinces were the cheapest that could be built, it being possible to put afloat in New Brunswick or Nova Scotia a vessel of this description fully equal in appearance to one built in Maine, and at a cost several dollars less per ton. If, under such favoring conditions, wood cannot compete with iron or steel, Canada has but one alternative, if she would maintain her shipyards, of seeking materials among the products of the mine rather than of the forest. In this new departure builders in the United States have already got the start, and by a long distance. On the Delaware River, convenient to the iron and coal mines of Pennsylvania, no less than 56 vessels have been constructed during the present year—five of them wholly of steel—and the indications are still more promising for the year 1884. It is claimed that the progress made in the Delaware yards since January 1 is equal to the entire business done in the same establishments in the whole of 1882.

Developments in the Tin Market.

As has been foreseen, the abolition of the 10 per cent. differential duty that was levied on East India products not arriving in this country by the Cape of Good Hope route has had the effect of equalizing the price here and in Europe very closely, and the facility of coming from London or Holland to the rescue of the New York and Boston markets, and vice versa, without much loss of time, has revolutionized the speculative portion of the tin trade, not only on this side, but also in Europe. In other words, it is not so easy as it used to be to get control of the tin market, and as some large operators on the other side have in consequence ceased to take an active interest in the metal, and transferred their attention to copper, this has so far been about the duller year in tin that we remember, the few manipulations undertaken by persons without much capital having had no perceptible influence on the market. Some five weeks since a leading London house wrote:

A sudden but short spurt took place by the withdrawal from this market to New York of about 750 tons from our stocks. It was not known at the time, nor, in fact, is it quite certain yet, whether this was done on account of a passing scarcity of available tin in New York, or whether the dealers in that market take a sanguine view of the future course of prices, and have determined to carry an increased quantity of tin. It caused a rapid advance of £3 per ton, of which about half has since been lost, owing to a cessation of this special demand. Consumption in other quarters continues on a full, but not expanding, scale. Holland is delivering rather less, and London a little more, to supply the wants of the trade. Supply continues full from the Straits, and without material change from other quarters. It is stated, on what we believe to be reliable authority, that about two-thirds of the London stock is tin bought by investors a long time ago, at prices much above current values. It is therefore a matter of considerable importance to watch the movements of the London and New York dealers, to see how they will work upon the exceptionally small quantities likely to be available within the next few weeks.

This shows, better than anything else we can cite, the precarious state at which tin speculation has arrived; it has become a sort of hand-to-mouth game, in which the real statistical position is lost sight of; the few operators left speculate from week to week; stocks accumulate and the amounts afloat become more formidable. Thus, on the 1st instant the visible supply in New York and Boston had suddenly reached the enormous figure of 4970 tons—or five months' consumption—due to the fact that from London alone 2100 tons of tin had been transferred this way in August. Up to August 1 the argument of operators for a rise at New York was chiefly based on the scant supply here; yet in a few weeks the whole aspect was changed, and instead of a dearth we had abundance. From these observations the conclusion is irresistibly arrived at that there is very little chance for profit left in the tin speculating business, and that it will probably remain devoid of features till the greater operators, temporarily engaged in Chili bars, take a hand in the game.

The trade will naturally ask why a metal which it is difficult to sustain artificially still commands so high a price, and the answer is not easy. On examining the latest European statistics we possess, we find the following:

	1882. June 30.	1883. July 31.	1882. July 31.
Stock of foreign tin in London.....	5,680	4,569	7,138
Foreign landing do., Straits afloat for London, including wire advices.....	363	421	.....
Australian do.....	470	655	.....
Belgian do.....	1,497	1,159	840
Belgian on warrants in Holland.....	1,104	1,424	1,327
Belgian in Holland.....	2,124	2,301	1,079
a float for Holland.....	1,214	860	666
Other foreign in Holland.....	4	.....	50
Total.....	12,356	11,472	11,694
Estimated stock in America and quantity floating.....	3,200	4,100	2,600
Total.....	15,556	15,572	14,294
Trading Co.'s reserves of unsold Banca stock in Holland.....	3,255	2,778	2,352
Floating for Holland.....	364	390	303
Price of Straits for cash, per ton.....	£24. 10/	£24. 10/	£104

On July 31, 1878, the price was £61, with a stock of 16,194 tons, and a year later £64. 5/, with a stock of 16,767 tons. On July 31, 1880, and July 31, 1881, the price was £90. 10/ till the great speculation carried it tem-

porarily to £110 during the winter of 1881-82. Since that time it has ruled continuously above £90, while the consumption has become smaller, and production has all along been greater than ever. China imports through the treaty ports annually between 4000 and 5000 tons of tin from the Straits, and in the event of a war with France, as at present threatened, the blockade of the treaty ports would limit the amount taken by China to the little that might still get into Hong Kong, so that, while the war lasted, these 4000 to 5000 tons would be so much additional supply for Europe and America, on top of stocks large enough as they are. On taking into account such possibilities, it must be confessed that tin, as situated at present, is certainly not one of the metals calculated to inspire the trade with great confidence in its future; that there is, in fact, very little reason for its still high ruling, and that no great revival in the demand for consumption can be looked forward to till it settles down to a figure somewhat more inviting than the one it still commands.

The Displacement of Iron by Steel.

Although the tendency to substitute iron for steel may seem to be a hackneyed subject, there are new phases constantly presenting themselves which are worthy of notice. The prophecy has been very freely made during late years that in a comparatively brief period the use of iron as a finished product would be restricted to a very limited field, if not altogether abandoned. From about 1876 to 1878 steel gained very rapidly on iron, especially in England, where many new steel works were erected and many iron works were adapted to the manufacture of steel. At that time the iron business all over the world was more depressed than the steel trade, and the end of the use of finished iron seemed to be near at hand. But the last four years have witnessed a decided reaction. The demand for iron revived, and up to a very recent date was in excess of the demand in any former years. Now the hunger for iron has been appeased, and in almost every part of the world the consumption of iron is less than it was a year ago. And here comes the fact which has a direct bearing on this subject, and causes these reflections on the displacement of iron by steel—the consumption of steel appears to have fallen off as much as that of iron.

There is as yet but one line which steel has monopolized, and that is the rail trade. Steel is fighting hard in other fields, but the battle is hotly contested, and the odds are only occasionally in its favor. Steel boiler plates are quite extensively used, but the demand for iron boiler plates has increased in recent years, and the inroads of steel have not been marked by the closing up of iron plate mills. The production of steel wire has greatly surpassed that of iron wire, but there are grounds for believing that for certain purposes iron wire will always be needed, and that its production must necessarily increase with the growth of these needs, which are in their nature progressive. The use of steel plates for shipbuilding is unquestionably increasing, but it has not kept pace with the great increase in maritime construction in Great Britain, the shipyard of the world, where more iron plates than ever have, in the recent shipbuilding "boom," been used in the construction of hulls. There is a growing demand in England and Wales for steel sheets for tinning purposes, but sheet iron has by no means been supplanted in the manufacture of tin plate or in other lines, either in Great Britain or in this country. Our sheet iron mills have been pressed with orders for years past. The use of bar iron has been unaffected by steel, although efforts have been made to introduce steel for special purposes in direct competition with it. Carriage tires are now made principally of steel, but that is not a trade of very large proportions. Steel beams are occasionally asked for, and there are some shapes which can be made as cheaply of steel as of iron; but general structural forms are almost invariably made of iron. Steel car axles are more widely used every year, but the manufacture of iron axles exhibits no sign of decay. The use of steel castings is becoming more diversified with the advance of time, but the steady demand for foundry pig iron shows that there is still a very large market for iron castings. Steel shafts and forgings are more common than they were some time ago, but they have not completely taken the place of iron forgings, which are still turned out in considerable quantities all over the country.

There is no doubt that the use of steel is growing, and that larger quantities will be used in the future than in the past, but the prophets who have peered so deeply into the future and have so vividly seen the immediate coming of the age of steel have been disappointed in the results so far accomplished. Iron has stubbornly refused to be forced out of use, and the indications are very favorable to the assumption that the country blacksmith, the carriage maker, the car builder, the machinist, the iron founder and their multitudinous collaborators will continue to use iron for an indefinite period.

The New York Board of Trade and Transportation, in a pamphlet recently issued to the Railroad Commissioners in regard to the so-called *pro rata* freight bill, make some very pertinent remarks, and quotes some very strong points from opinions of the great railroad men. Quoting Mr. Fink, the

present Pool Commissioner, who is a recognized authority on all railroad questions, they make the point that in railroad matters the unit upon which rates should be based is the carload. When a man ships by the carload, the conclusion which they reach, and which is well sustained by the authorities, is that he is then entitled to the minimum rates, and, consequently, stands in the position of a wholesaler. Less than this, of course, the rates should be those for the retailer, but the conditions of railroading are such that there seems to be no gain to the company in economy of handling, whether it be one or five cars which are shipped by a given person. Bearing this out, Mr. Fink says in effect that while there is good ground for discriminating between small and large shipments, there is no such ground when shipments are made by the carload. Where it is merely a question of one or more carloads, no additional cost, he says, is incurred by the railroad company. These are facts which it is well for the manufacturer to bear in mind.

Metal Imports at New York in August.

Although the entire foreign metal trade of the United States is not concentrated at New York, the greater part of such imports is received here. The statistics of New York imports are therefore of value in indicating the nature of our foreign trade, even if they do not show its entire volume. In fact, they are the only figures of any consequence in this direction which are accessible immediately after the close of the month. The publication of the total statistics of our foreign trade is, doubtless for very good official reasons, always deferred so long after the expiration of the time they cover that their practical value is largely lost. The New York metal imports for the month of August are presented in the following table, in comparison with the imports in July:

	July.	August.
	Tons.	Tons.
Pig iron.....	12,527	18,106
Spiegeleisen.....	8,164	3,681
Old iron.....	730	475
Steel.....	none	114
Steel blooms.....	none	62,720
Steel rails.....	8,059	4,877
New iron rails.....	112	135
Steel-wire rods.....	2,864	3,333
Iron-wire rods.....	756	640
Swedish iron.....	3,875	3,924
Bar iron.....	296	47
Iron beams.....	99	157
Hoop iron.....	253	428
Sheet iron.....	432	379
Bar steel.....	483	439
Steel tires and forgings.....	486	359
Tin plates.....	11,675	10,786
Total iron and steel.....	50,832	48,004
	Pounds.	Pounds.
Old copper.....	8,848	9,337
Old brass.....	6,630	11,276
Pig lead.....	125,440	150,080
Old lead.....	10,965	3,498
Spelter.....	824,160	437,840
Sheet zinc.....	none	62,720
Scrap zinc.....	none	2,500
Reg. antimony.....	131,800	144,000
Nickel alloy.....	18,000	12,505
	Tons.	Tons.
Iron ore.....	1,860	5,731

In both months there were no imports of old rails, Russia sheet iron, iron tubes, ingot copper, ingot brass and pig tin. It will be observed that importations are small of everything except pig iron, spiegeleisen, steel rails, steel wire rods, Swedish iron and tin plates. Pig iron shows an increased movement of some consequence, while spiegeleisen and steel rails have fallen off heavily. The total imports of iron and steel have varied but 232 tons in the two months. Importations of iron ore have increased greatly. The stocks of iron and steel in the bonded warehouses are not large. At New York there was a slight decrease during the month of August, but there was an increase at the ports of Philadelphia, Boston, Baltimore and New Orleans, as the following table will show:

	New York.		Other ports.	
	On Aug. 1.	On Sept. 1.	On Aug. 1.	On Sept. 1.
Pig iron.....	2,166	2,725	1,569	2,545
Spiegeleisen.....	534	534	599	915
Old rails.....	1,271	1,135	913	1,016
Old iron.....	2,017	971	1,130	1,186
Old steel.....	306	306	none.	none.
New iron rails.....	none.	none.	266	355
Steel rails.....	191	191	none.	none.
Total.....	6,415	5,783	4,900	6,035

The value of waste products as factors in manufacturing are becoming better and better understood, and everywhere men are giving attention to their utilization. Years ago, in the saw-mills, slabs, edgings and a perfect raft of other similar refuse were thrown into the river or streams every year, to form bars and obstructions to navigation. Now all this has been changed, and in many places not even sawdust is wasted. The establishment of manufactories needing timber in small pieces has enabled the mills to use up this formerly wasted lumber. Tin scrap, at one time the most utterly valueless of all metal wastes, is used at the present for a variety of purposes, and that which is too small for the toy makers finally reappears in the form of sash-weights. In photography, the preservation and refining of the residues is of vital importance, and the same is true of many other arts. Inventors, however, who turn their attention to these wastes are frequently deceived by apparent values, and often make mistakes from an ignorance of market values. For example, within 100 miles of the coal fields of Pennsylvania efforts have been made to utilize peat bogs, and expensive machinery has been erected to put it into a marketable form. In such a locality, and with coal available at \$5 or \$6 per ton, the idea is im-

practicable. The utilization of the dumps of the coal regions is another scheme which has set many an inventor wild, but, promising as these dumps appear, they are really not worth reclamation—at least, not with the present range of market prices and cost of transportation.

Effects of Speculation in Japan.

Trade and commerce in Japan are prostrate, owing to the scarcity of money among all classes. The payment of obligations contracted abroad, together with the cost of suppressing internal dissensions, left the Government virtually bankrupt, and in its extremity resort was had to an issue of paper known as the Kinsitsu. An era of speculation followed, and now comes the collapse. Of coin there is none, except in trifling amounts, and the Kinsitsu has depreciated within the short period of six months from 175 to 125. The effect is to overwhelm the debtor class, who constitute a large proportion of the population. And yet there are persons high in influence who advise a heavy Government loan, not only deferring the day of final liquidation, but adding to the burden. A writer who is supposed to know says: "Manufactories there cannot be, because of the lack of capital in individual ownership. The coast trade is conducted entirely by two joint-stock companies, behind which is the Government. All the vital interests of the Empire are undeveloped for lack of capital, and the shadows of the present gloom reach away into the future, covering it with doubt and uncertainty." The last blow is the difficulty experienced in marketing the tea crop, on account of its alleged inferior quality. The more immediate cause of the financial crisis in Japan doubtless arises from the recent imposition of a tax on every purchase and sale on the exchange boards, with the object of suppressing gambling. Any but legitimate transactions being almost impossible, the effect is equivalent to a very considerable withdrawal of capital from circulation, Chinese and other foreigners lately engaged in bulling and bearing the currency of the Empire being driven out of the markets.

A foreign writer, in reporting the Chicago Exposition, makes the statement that the exhaustion of certain kinds of ores in the United States has diminished the output of charcoal and other fine irons, and as a consequence the cast-iron wheel of the present day has greatly deteriorated, and its life been very considerably reduced, all of which would seem to prove that the author was better acquainted with the steel-tired wheel-makers than with cast-iron wheel-makers. A sufficient commentary on this subject is found in the fact that within a comparatively few years it has been possible to make contracts for chilled cast-iron wheels with a guaranteed life considerably greater than anything that was ever attempted in the past. If a man wishes for a good cast-iron wheel, he can get it as good at present as it has ever been obtainable. If he wishes a poor wheel, he can undoubtedly get just as poor a wheel as he dares put under a truck. Indeed, we believe that if a man is sufficiently unscrupulous, he can obtain almost anything in the shape of a wheel that will hold up a car at rest; but this by no means shows that car-wheels have deteriorated on account of the exhaustion of the iron ore of the country, or that the life of a cast-iron wheel has been shortened for this reason.

The mixed Army and Navy Commission sent out by the Government to report on the principal cannon factories of Europe are said by foreign correspondents to be composed of decidedly good fellows, and likely to succeed in getting all the valuable information that there is afloat on the particular subject they are investigating. It is said that at St. Petersburg they will have every possible courtesy extended them by the Russian Government, and that most countries will throw open their foundries and permit inspection, except, of course, Germany, who, as usual, will try to keep concealed as far as possible her means and methods. The amount of valuable material which these officers will obtain will be considerable, and it rightly used the Government will be able to take advantage of all that has been done abroad without the necessity of undertaking those tremendously costly experiments which have been such a burden upon foreign governments during the last 10 years.

The repairs of the Pittsburgh pumping engines are progressing in an apparently favorable way. The latest news is that the air-chambers have been so modified that new castings will be in several pieces instead of one. The principal parts of two engines are to be supplied, and there are to be several duplicate pieces. Many of the lower sections of the valve-chamber have already been cast, as well as an upper section, two plungers and four pump barrels. There are still an upper section, two pump barrels and the check-valve chamber remaining to be cast. It is said that the material has all been accepted, and that the test pieces have come fully up to the specified requirements and in one or two cases exceeded them. This makes things look more hopeful, since the dividing of many of those complex castings is in itself a very material gain.

Broadway will soon be torn up again by the New York Steam Company, which is required to put a layer of concrete under the

pavements disturbed in its operations. It is estimated that this will cost some \$5000. The streets that have to be kept in repair for a year by the company are Broadway, Greenwich, Warren, Barclay, Park Place, Vesey, Fulton, Liberty, Cortlandt, Maiden Lane, Wall, Whitehall, Mail, Ann, Pine, Park Row and Theater Alley. The Commissioner of Public Works has also notified the suspended American Steam Heating Company that it must put the streets through which its pipes were laid in thorough repair, or he will sue on the bonds filed for the faithful performance of its obligations.

A Business Experience in Russia.

Mr. O. W. Maddaus, who went to Russia some years ago, for the purpose of establishing a business there in the manufacture and sale of hardware, and who has lately returned to this country, has given us the following interesting account of his experiences there:

Starting in manufacturing a new line of goods is no easy task even in this country. The needed capital, a plant new in construction, labor skilled for this plant, and the proper management, are all conditions precedent to success. How much more difficult, vexatious and tedious a job it is to start anything new in the manufacturing line in a country only partly civilized and not very favorably disposed toward new processes or products, the writer has learned to appreciate.

Russia, with her vast resources, could be a rival of the United States in trade, manufactures and agriculture, if her ruling classes were not altogether devoid of enterprise. The dependence on Government aid of every great undertaking in Russia is proverbial. No country pays more subsidies to railroads, manufacturers, mines and agriculture, with a view to developing the resources of the country. This assistance of the Government, with the unavoidable stealing and fraud which follow in its train, is just what prevents the already indolent rich man from embarking in new enterprises, unless aided by the Government. Beyond all other causes of the decay of trade and industry, however, is the present social and political condition of the Russian Empire, which is fatal to business enterprise. The insecurity of the Government fills every one with apprehension as to what may come on the country at any moment. Russia is evidently bankrupt with her 8,000,000,000 roubles of national debt. She can never redeem her obligations, although attempts at saving are made by abolishing the use of brass buttons on military uniforms, and substituting a belt with holes enough in for tightening to make a Dr. Tanner out of every one of the men.

My personal experience in a six years' attempt to take advantage of openings for the introduction of American hardware and machinery, partly manufactured in Russia and partly imported, may be of interest to the readers of *The Iron Age*. After preparing a well-selected stock of hardware and implements, I set out in 1877, intending to settle in Riga, that being a convenient port for importations and well connected by rail with the interior, besides having the best educated and most intelligent class of people in all Russia. I hoped to secure enough help from enterprising Russians to give me sufficient means to manufacture and import on a large scale. I found that before being allowed to trade it was necessary to pay, besides the rather moderate license, Government, city, church and poor rates, making, altogether, about 250 roubles for a second-guild merchant, who can only import. A first-guild merchant has to pay 1000 roubles for being allowed to export and import. For every clerk employed, whether male or female, the merchant has to pay extra 20 roubles for a first-class and 10 for a second-class clerk.

My American goods were very much admired. I had only first-class goods, and no door locks for a dollar a dozen among them. The prices were considered high, however, and no wonder, considering that the duty on fine hardware is from six to ten times the duty on cheap ware, all paying by weight. The duty had to be paid in gold at 60 per cent. premium, besides innumerable little annoying expenses at the appraiser's office, consisting of compulsory tips, stamped paper, weighing, cartage, "going's round the corner" with the officials, &c. Having brought with me a set of patterns and some material to make the Union spring hinge, I started within six months the manufacture of this hinge on a small scale. I soon found, however, to my extreme disgust, that it was utterly impossible to procure the castings. They could not be made satisfactorily at all, although I was paying 10 cents a pound for gray iron castings. They were always hard and out of shape, and at least half of them had to be thrown on the scrap heap after paying for them and spending some labor on them.

The demand steadily increasing, I had to find ways and means to produce more goods. From this period my difficulties began. Knowing that a foundry run with crucibles would not pay—crucibles and coke having to be imported, as well as pig iron—I tried to raise sufficient capital to start on a scale large enough to cast from a cupola, adopting the tilting cupola frequently used for tests of new or fresh brands of pig or mixtures in American stove foundries. This involved the entire plant for the working and finishing of the castings. At about this time, in the fall of 1879, the export of Russian staples fell off rapidly, and times became extremely dull. New ventures were never very attractive to Russian capitalists, and my enterprise was looked upon with distrust, everybody telling me that those goods could not be made to compete with the imported ones, and warning me against the prejudices of the dealer. I knew very well, however, that the dealer little cared where the goods were made, as long as he was getting a good article at prices below the cost of importation. The Russian hardware dealer's prejudices against cast-iron goods were known to me, but I had been successful enough with some cast-iron hardware, and was confident of being able to introduce, one by one, articles of the like material.

Some of my customers among the nobility, who had been following my endeavors in other business matters with interest, offered me water-power, ground and clay for bricks

on their estates, for a share in the business, but declined to invest cash. These very kind offers were useless to me, and with less than \$20,000 the attempt was an extremely difficult one. However, I secured the promise of assistance after I had started, and considering these promises good I resolved to build on my own ground, and at my own expense, two brick structures with wooden extensions, comprising a foundry, finishing shop and plating-room for nickeling and silvering. I also put up a jappanning furnace of about 1 ton capacity. I eventually proved that fine goods could be produced at very advantageous prices, because labor is extremely cheap, as the following scale of labor prices in American money shows:

Molders, best procurable, per week, day work..... \$4.50
Mechanics for turning, filing, &c., per week, day work..... 4.50
Per week, piece work, about..... 7.00
Cabinet makers and wood turners, per week, day work..... 3.50
Per week, piece work, about..... 5.00
Boys in the foundry and for drilling, per week, day work..... 1.25
Per week, piece work..... 2.00
All these men could have commanded from \$12 to \$18 per week in American shops. Watchmen, drivers and other unskilled laborers are paid \$10 a month, without board or extras. I confess to having had a year and a half's struggle before getting industrious and sober men, but still enough were always applying for work to pick from, because I was known to pay high wages (those above quoted).

Having got thus far, I thought it time to have the promised assistance tendered, but of all the excuses made none excused himself for not having come along earlier. The fact of the matter was that business was still, and is yet, on the down grade, and many firms have had to wind up and withdraw altogether from the country. To work up stock without capital was impossible, and orders for railroad and horse-car trimmings became scarcer, nothing being done at the car works but now and then a few tank-cars for the petroleum regions, and very few passenger cars. Indeed, the car works in Riga, fitted up for 1200 men, had at last account about 300 employed, and were making showcases and furniture to give this number employment. Being without competition, I could have made sales enough, even for cash, to leading importing houses, had I been able to run the shop with a full set of men on standard goods, without needing to care for orders from the car works. I often wanted to give up the struggle, but persuaded myself to wait for the National Exhibition at Moscow. This was to be a grand affair, the Government having given 3,000,000 roubles to aid it in becoming a success, and a success it was, as far as the show was concerned. The money was spent and the people had to pay admission and higher taxes to make good the loss. I understand the admission receipts were not quite 1,000,000 roubles in the six months the fair was open. Space to exhibitors was free of charge, to induce as many producers as possible to attend. Americans would have been surprised to see the exhibition of natural resources Russia could bring forward, but exhibiting is one thing and developing another. The textile industries are the only ones well developed, but much more could be done, and should be done, but is not done. Ask a Russian the reason, and he will shrug his shoulders and say: "Jah nay mi" (I don't know). He is afraid of talking politics.

The exhibition of textiles was brilliant beyond description. Foreign visitors gave this department the credit for being the best they ever saw. In fine carriages, sterling silver ware, church bells (one weighing nearly 30,000 pounds), ceramics, candies, liquors, and precious stones from the Ural, the exhibits were superior. I also noticed some very well made passenger and ambulance cars of novel designs. The machinery department was slender in size, but contained some fine machinery and first-class heavy castings. The almost total absence of agricultural machinery and implements was surprising for a great grain-growing country like Russia. The dog show was better than the cattle show, a few fine specimens excepted. I was awarded the great silver medal solely on the merits of my exhibit. I had no cash to invest, and did not treat the crowd of experts, as some are said to have done to get awards. During the exhibition I made a trip to the East, touching Nishni, Novgorod and Kasan, and reaching the Siberian frontier. I picked up orders from numerous parties, but they were not carried out until I reached the factory, the man in charge having lost his head, and let the shop run behindhand. He was no manager under difficulties. I lost my temper after all these disappointments, and cut the whole affair short by turning everything over to the mortgages. May some one of those enterprising natives carry on the manufacture of hardware and turn out the quality of work that I made. I was done with Russia and the Russians, and returned to New York and my old avocation. I have brought with me the conviction that Russia is a large field for enterprise, and that a time will come when foreign capital and management will reap a rich harvest in that country to the enterprising. I based my speculation on the assistance of Russian, capital and therein made a serious mistake. It is one which others would do well to avoid.

The Westinghouse Air-Brake Company have just concluded contracts with the Union Pacific, Central Pacific, Northern Pacific, and Atchison, Topeka and Santa Fe roads, for equipping all their freight cars and engines with air-brakes. George Westinghouse, who was in the city recently with a party of friends, said that his company had made a new departure in these contracts, and instead of putting the brakes on by royalty, as on passenger coaches and engines, they will sell them outright to the railroad company at \$50 each. There are some 1200 freight cars on the Union Pacific system, and it will necessarily take some time to supply them all. They will begin work first on the Denver and South Park Division, after on the main line and branches, and finish with the Kansas Pacific Division. The Westinghouse Company have now in use brakes on 14,000 engines and 55,000 passenger cars.

The Bottom Facts About the First American Steel Rail.

The following, from Mr. W. F. Durfee, of Bridgeport, Conn., in regard to a claim made by a Mr. Hahn, is decidedly rich reading. We presume that the original claim by Mr. Hahn was made under the impression that it was W. F., instead of Z. S., Durfee who died. The answer must certainly have been a startling one. The correspondence is from the Bulletin of the Iron and Steel Association. As a matter of historical record the question is doubly interesting:

To the Secretary of the American Iron and Steel Association.—SIR: Your inquiry is received respecting the correctness of the following statement, which is taken from the Pittsburgh Dispatch of July 12: "The first steel rails rolled in America were manufactured—not in Chicago, as commonly believed—but at the Wyandotte Rolling Mill, at Wyandotte, Mich., on May 11, 1865. On May 24, 1865, steel rails were rolled at the North Chicago Rolling Mill, in Chicago, and as this was accomplished in the presence of a large number of members of the American Iron and Steel Association, which society then had a meeting at the Tremont Hotel, in that city, that date and place became better known among iron and steel manufacturers."

Several steel rails and an assortment of other shapes, plates, bars, &c., of the same material, bent and treated in various ways, to show its ductility, strength and homogeneity, were on exhibition in the vestibule of said hotel during the session of the society, and attracted great attention. The ingots for those rails, &c., were made at Wyandotte, Mich., by Ignatius Hahn, of Pittsburgh, who was there as superintendent of the Bessemer steel works, on May 4, 1865; produced at once serviceable ingots the second day thereafter (May 6); got ingots heated, hammered and rolled out to rails of 60 pounds weight per yard, under his directions, at the Wyandotte Rolling Mill on May 11, and subsequently, also, at the North Chicago works on May 24 and 25, 1865.

In reply thereto I have to say that I designed all the machinery, and actively supervised the erection and working of the same, in the Wyandotte Steel Works, to the date of my resignation as its superintendent, June 1, 1865. For several weeks prior to the date (May 11, 1865) when it is claimed that "rails of 60 pounds per yard" were rolled at Wyandotte, Mr. Ignatius Hahn had acted as my assistant, and whatever he did at Wyandotte, in connection with the steel works or its products, previous to June 1, he did in that capacity. During the time which intervened between the date of my resignation and his somewhat sudden and unceremonious departure from Wyandotte, on or about July 4, 1865, Mr. Hahn was nominally superintendent of the steel works, but acted under the general direction and supervision of the late Z. S. Durfee, who was secretary of the Kelley Process Company, to whom the works then belonged. In addition to my duties as superintendent of the steel works, I was for several months employed as the mechanical engineer of the Wyandotte Rolling Mill, which was in close proximity, and was charged with the entire re-arrangement and partial rebuilding of its rail mill, which work was completed but a short time previous to my resignation.

Such having been my relation to the steel works and rolling mill, I think I am a competent witness as to what was done in the latter with the steel produced in the former establishment; and I assure you that the above clipping from the Pittsburgh Dispatch contains the first information that I ever received that any steel rails were rolled at Wyandotte, either on May 11 or any other date, during my connection with the works. Indeed, I have a distinct recollection that the superintendent of the rolling mill objected to undertake the working of steel in rolls which were proportioned for working iron, alleging that, in case a roll was broken, he would be very much embarrassed in getting out work which he had contracted to deliver at a certain time.

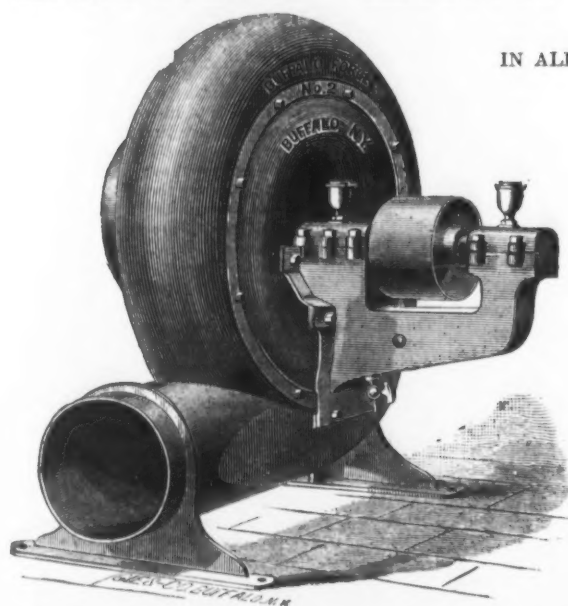
Now a few words as to the ingots which were sent to Chicago, from which the first steel rails rolled in America were really made. I have not at this time memoranda by me to enable me to state positively whether these ingots were made while Mr. Hahn was acting as my assistant or not, and whether they were or not is of very little importance, as there was a large number of ingots of excellent steel at the works that were made a long time before Mr. Hahn came to Wyandotte, which were quite as good as any made while he was there. I now have in my possession two large jack-knives whose blades are made of some of the earliest steel made at the Wyandotte Steel Works. The steel of which these blades are made is so low in carbon that they were hardened as hard as fire and water could make them, in order to retain their cutting edge. Some of the first steel made at the works was sent by me to Mr. James Ferguson, then and now superintendent of the Bridgewater Iron Works, at Bridgewater, Mass., and he had it rolled into "tack plate" and cut into tacks—the first steel tacks made in America, if not in the world.

The following letter, written the day after the rails were rolled at the Chicago Rolling Mills, will, I think, be found of interest, as showing just what was thought at the time by those interested in the then new process, and it has another value, inasmuch as it gives the names of prominent iron men who were present when the first steel rail was rolled.

W. F. DURFEE, Engineer.
S. CLEMENT, President.
O. W. PUTTER, Secretary and General Supt.
Office of THE CHICAGO ROLLING MILLS,
16 and 18 River street.
Chicago, May 26, 1865.

MY DEAR DURFEE: The meeting of the iron and steel men adjourned yesterday, to meet in Cleveland the fourth Wednesday in August. I regret very much you could not have been here, particularly to see how well your steel behaved, and you must allow me to congratulate you upon its entire success, and I assure you I was but too proud, for your sake, that everything we had to do with it proved so very successful. The ham-

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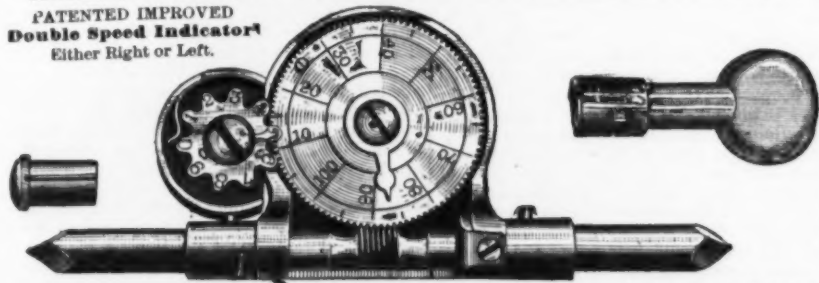
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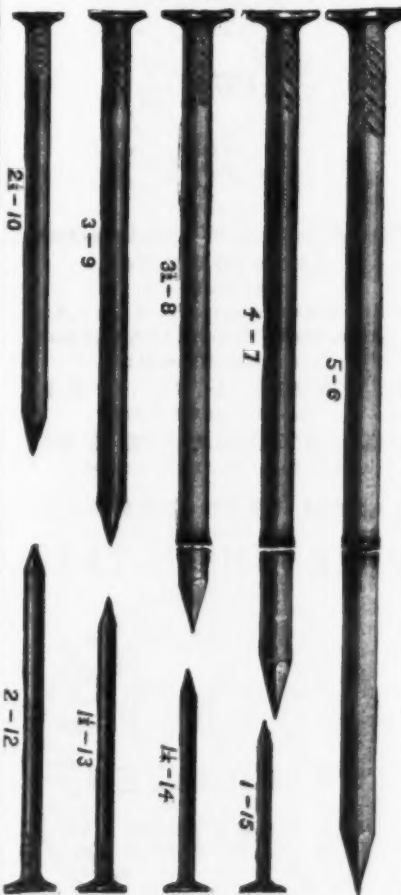
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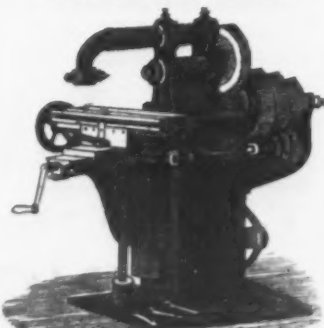
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mer was altogether too light, of course, and it took more time than it otherwise would to draw the ingot down, yet all the pieces worked beautifully, and we have made six good rails from the ingots sent over, and not one bad one in any respect. The piece you sent over forged is now lying in state at the Tremont House, and is really a beautiful rail, and has been presented to the Sanitary Fair by Captain Ward. We rolled three rails on Wednesday and three on Thursday. At the first rolling only your cousin and George Fritz were present; at the rolling yesterday were Senator Howe, of Wisconsin; B. F. Jones, of Pittsburgh; R. H. Lamborn, of Philadelphia; Mr. Phillips, of Cincinnati; Mr. Swift, of Cincinnati; Mr. Kennedy, of Cincinnati; Mr. May, of Milwaukee, and three ladies; Mr. Seefeld, of Milwaukee; Mr. Fritz, of Johnstown, and Mr. Thomas, of Indianapolis, with four strangers. Everything went so well I really wanted you to see some of the good of your labors for so long a time and under such trying circumstances. You have done what you set out to do, and done it well, and I am glad to congratulate you and rejoice with you, for I can appreciate some of your difficulties, and wanted you to hear some of the praises bestowed upon your labors, as you richly deserve. I know this would make no sort of difference to you, yet we all have vanity enough (especially in such cases as this) to feel gratified at any little compliments we know we are entitled to; but I will not tire you with any more, as your cousin (the late Z. S. Durfee) can tell you all, and more than I can write, but, with kindest regards, allow me to remain, Yours most ob't., O. W. POTTER.

WASHINGTON NOTES.

(From Our Own Correspondent.)
WASHINGTON, D. C., Sept. 12, 1883.

THE NEW TARIFF LAW NOT PERFECT. The new tariff law, from which so much was expected in the way of removing ambiguities and healing controversies growing out of interpretations of the law, appears to be giving trouble. The first important case of this character comes up under a question submitted to the Treasury Department in the matter of the duties on round iron. Round iron in coils or loops, and thinner than No. 5 wire gauge, for the manufacture of rivets, screws, nails and fence wire, is specially provided for in one paragraph, while another paragraph provides in general terms a high rate on round iron in coils or rods. Such a chance for a controversy could not well be avoided. The department, upon a general consideration of the question, is inclined to take the view that all round iron rods of the size included in the first class of articles, such as the manufacture of rivets, screws, nails and wire for fences, and declared by the importer to be intended for such purposes, would come under the rate fixed in Paragraph 180. The department does not incline to the proposed view that wire rods would come under the proviso in an earlier paragraph (148) regulating the duty on iron in the manufacture of which charcoal is used as a fuel, nor that the \$22 per ton duty on charcoal iron can be applied to the kind of iron mentioned in Paragraph 148. This subject promises to make tariff matters interesting.

INDUSTRIAL PROGRESS IN CANADA. The census reports of Canada for 1881, just received by the Government, show the industrial affairs of the Dominion of Canada to have been marked with considerable progress during the decade 1871-81, as follows:

	Capital invested, 1871.	1881.
Ontario.....	\$80,750,847	\$137,884,010
Quebec.....	50,216,992	28,071,868
New Brunswick.....	8,425,282	5,076,176
Nova Scotia.....	10,185,060	6,041,056
British Columbia.....	2,052,815	.....
Manitoba.....	1,383,311	.....
Prince Edward's Island.....	2,085,176	.....
The Territories.....	104,500	.....
	Value of product, 1871.	1881.
Ontario.....	\$157,080,870	\$114,706,799
Quebec.....	104,662,258	77,205,182
New Brunswick.....	18,512,658	17,307,687
Nova Scotia.....	18,575,326	2,338,105
British Columbia.....	3,226,784	.....
Manitoba.....	3,413,086	.....
Prince Edward's Island.....	1,400,208	.....
The Territories.....	105,038	.....

A statement of the amount of minerals produced in Canada for the year 1881 places the production of iron ore at 223,057 tons; coal, 1,307,824 tons; gypsum, 183,076 tons; petroleum, 15,490,622 gallons, and salt 472,074 barrels.

The pipes for the pneumatic tube service of the Western Union Telegraph Company are being laid between the building of the company, at Broadway and Dey street, and the new building at Fifth avenue and Twenty-third street. Four brass tubes, each 3 inches in diameter, will be put down. In the same trench will be laid two 5-inch iron pipes for holding telegraph wires to be used in local business. The company now have 75 miles of wire underground between the main building and the Stock and Cotton Exchanges and the North River cables. The pipes are laid 4 feet underground, to be out of reach of the frost. The pneumatic tubes will be in operation early in the winter. Pneumatic tubes now run to the newspaper offices, the Stock and Cotton Exchanges, the Equitable Building and the cable offices. The new Produce Building will be connected with the main office in the same way.

A few days ago the assistant engineer at the Spring Garden Water Works, Philadelphia, discovered that the intermediate valve between the pump and the check-valve on one of the boilers of the works had been shut, thereby cutting off all supply of water. The 12 boilers of the works are fed by the same pipe, and the exhaustion of water in one would cause the explosion of all. It is thought the valve was turned by some one from motives of spite or revenge, as it had not been turned for months before, and could not have been done accidentally.

The Cotton Crop.

We are indebted to the Commercial and Financial Chronicle for advance sheets of its annual statement of the cotton crop, from which we make the following extracts: The total crop this year, ending September 1, reaches 6,992,234 bales, while the exports are 4,745,709 bales, and the spinners' takings are 1,772,912 bales, leaving a stock on hand at the close of the year of 232,106 bales. The whole movement for the 12 months is given in the following. The first table indicates the stock at each port September 1, 1883, the receipts at the ports for each of the past two years and the export movement for the past year (1882-83) in detail, and the totals for 1881-82 and 1880-81:

Stock Sept. 1, 1883.	Exports year ending Sept. 1, 1883.	Receipts for the year ending Sept. 1, 1883.	Ports.
53,609	4,745,709	1,690,473	Louisiana
1,603,947	1,772,912	311,253	Mississippi
45,092	1,448,855	311,253	South Carolina
37,073	1,602,592	887,418	Georgia
3,441	1,602,592	20,168	Florida
17,611	1,602,592	887,418	Alabama
17,611	1,602,592	20,168	Virginia
8,83	1,602,592	18,158	New York
13,024	1,602,592	13,271	Boston
431,773	1,602,592	13,271	Philadelphia, &c.
144,885	1,602,592	77,009	Port of Spain
1,602,592	1,602,592	1,602,592	San Francisco
1,602,592	1,602,592	1,602,592	Totals—This year.
1,602,592	1,602,592	1,602,592	Previous year.

* These figures are only the portion of the receipts at these ports which arrived by rail overland from Tennessee, &c.

If now we add the shipments from Tennessee and elsewhere direct to manufacturers, and Southern consumption, we have the following as the crop statement for the three years:

	1882-83.	1881-82.	1880-81.
Receipts at shipping ports.....	6,010,718	4,720,364	5,874,090
Add shipments from Tennessee, &c. direct to manufacturers.....	641,496	477,481	510,213
Total.....	6,652,214	5,197,845	6,384,303
Manufactured South, not included above.....	331,000	238,000	305,000
Total cotton crop for year.....	6,992,234	5,435,845	6,689,303

To show, therefore, the progress made in the movement since 1873-74, we give the following statement of total crop and overland, and percentages of increase and decrease of each, for a series of years:

	Total yield, 1873-74 to 1882-83.	Gross yield, 1873-74 to 1882-83.	Per cent. increase and decrease, 1873-74 to 1882-83.
Crop of Bales.....	1,217,215	1,134,788	Inc. 7.26
1882-83.....	6,992,234	5,197,845	Inc. 34.61
1881-82.....	5,435,845	5,197,845	Inc. 4.40
1880-81.....	6,689,303	6,384,303	Inc. 4.40
1879-80.....	5,757,397	5,197,845	Inc. 10.45
1878-79.....	5,073,531	5,197,845	Inc. 2.45
1877-78.....	4,811,265	5,197,845	Inc. 7.96

Change from season of 1873-74 to 1882-83..... Inc. 67.64 Inc. 144.87

While we are inclined to-day to look for a decrease in the aggregate yield, we cannot, if the fall season is favorable, see any evidence that it will be large enough in amount to affect the sufficiency of the world's supply. Those who do not wish to repeat the error of two years ago should remember that the crop of 1882-83 has not only provided for spinners' consumption, but has also increased stocks visible and invisible nearly 700,000 bales. Hence, with the contribution from other countries unchanged, and our crop a million bales less (there is no present probability of the loss being nearly so great), unless there is an unexpected revival in the spinning industry throughout the world the year will close with the total visible and invisible stocks considerably larger than they were October 1, 1882.

SEA ISLAND.

The total growth of Sea Island this year is 36,924 bales; and with the stock at the beginning of the year (130 bales), we have the following as the total supply and distribution:

This year's crop.....	36,924
Stock September 1, 1882.....	130
Total year's supply.....	37,054

Distributed as follows:

Exported to foreign ports.....	23,457
Stock end of year.....	23,457
Leaving for consumption in U. S.....	13,597

We thus reach the conclusion that our spinners have taken of Sea Island cotton this year 13,597 bales, or 1150 bales less than in the previous year.

The net output of telephones by the American Bell Telephone Company for the month ending August 20 was 3569. This is the lowest of any month since September, 1881. The output the corresponding month last year was 4678, and in 1881 was 5021. The output for the first six months of the present and last fiscal year were as follows:

March.....	1882.	1881.
April.....	1,102	4,730
May.....	6,560	7,342
June.....	7,460	6,758
July.....	6,364	7,038
August.....	3,757	3,846
August.....	4,078	3,590
Total.....	34,178	31,704

(Continued from Page 1.)

kind of pig used, continuity of working, and the carrying of the iron, without cooling, through to the finished product. The cost of fuel, as between gas and coal, and also the difference in the price of coal in different localities, are modifying elements. Bearing in mind the presence of these modifying causes, the aggregate cost of making muck bar from pig, by the pneumatic process, may be stated not to exceed \$9 per ton.

On the point of waste there is need of some further remark. This gathers at four points—the cupola, the converter, the baller and in subsequent reheating and rolling. In the cupola and converter the waste is the same as in the Bessemer process and is put down at not above 13 per cent. The waste in the baller is stated to be found so fully under control as to be reduced to almost nothing. The waste from subsequent reheating and rolling is found to be considerably less than the waste in similar operations on puddled muck bar, because this product is

The reply to the Government inquiry in the case of Mr. Trevethick, the locomotive superintendent of the Madras Railway Company, is pointed, exhaustive and convincing. He admits that there is an apparent feasibility about the proposition to increase the working of the locomotive engine, but when viewed practically, and in the light of actual working, there were good reasons to be careful how any change was made. There was a great difference between a locomotive and a marine engine, the latter being capable of continuous working for days and weeks together, while the former could not so be worked. The difference in construction, and the widely differing conditions under which the respective classes of engines were used, also render a difference in working power; and though at first glance it would not seem to involve any great difficulty to extend the present run of engines on railway lines by putting on fresh men, and changing only the staff, and not the engine, yet there were many delicate points which would have to be considered before such a change could

iron ore is three-quarters of a mile long, half a mile wide and from 400 to 700 feet high. Its cubical contents, it is calculated, amount to 200,000,000 tons upon the surface of the surrounding plain. What its depth may be below that line can only be conjectured. The company have been busy all summer getting their preliminary plant in position—a furnace, a foundry, machine shop, sawmill, &c.—all brought from the United States. It is expected that the company will begin making iron about the 1st of October. They will have a monopoly of the market, and at what profit can be judged when it is stated that a cooking stove costs \$150 here, and a common skillet \$2.50, and other articles of iron at corresponding prices. Up to this time there has not been a blast furnace in all Mexico! Several wealthy ironmasters from Ohio have just made a visit to the works at Durango, and return home very much pleased with the enterprise and the country. Durango is a charmingly located city of 30,000 inhabitants. Two railroads are approaching from the north and northeast as rapidly

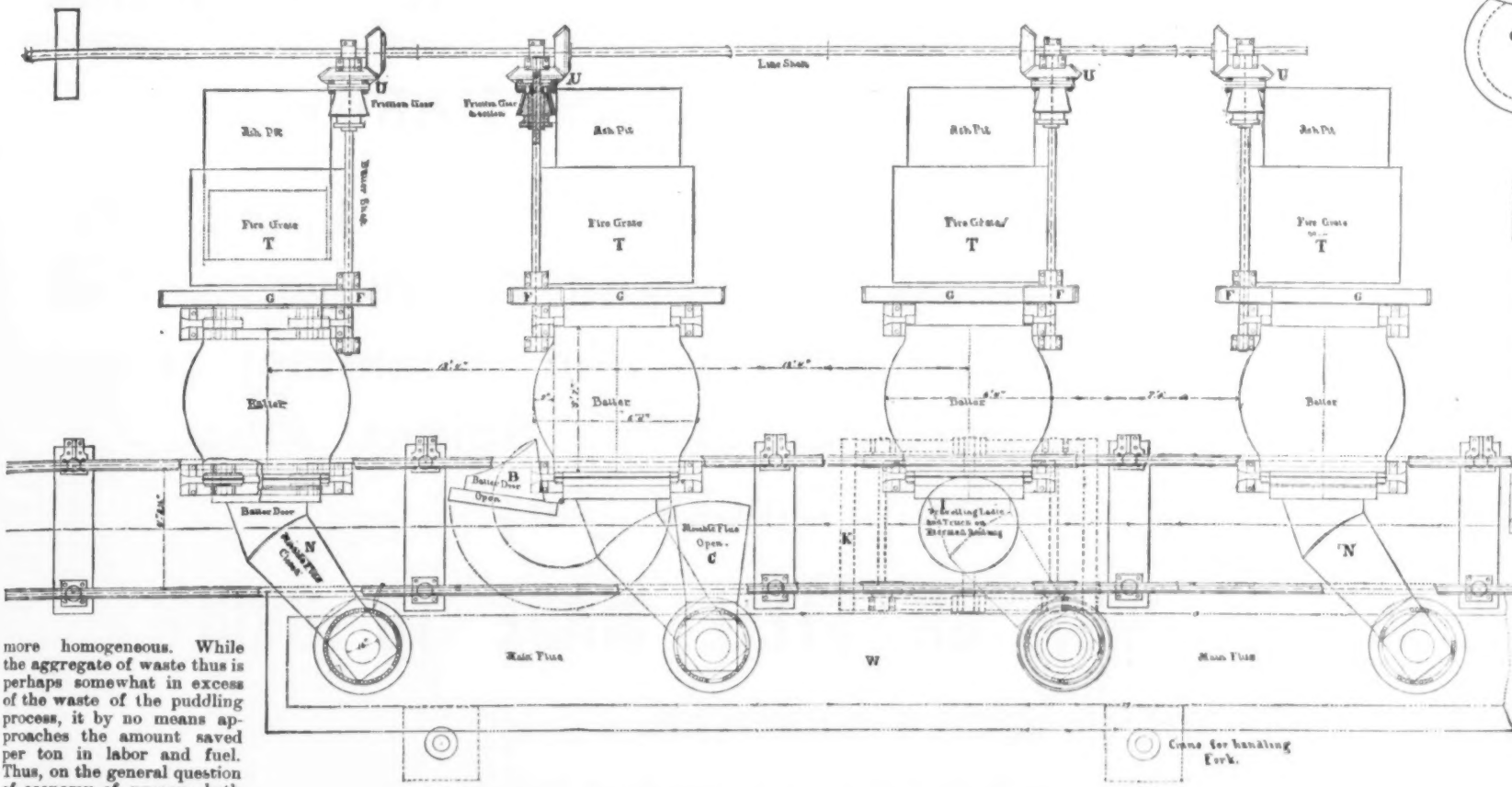
the street leading to it have also been dug out, and it is expected that an entire quarter of an ancient city will be brought to light.

The Seraing Works.

The well-known works of the Société Cockerill, at Seraing, Belgium, have of late been described at some length in many of our British contemporaries, having been brought into still greater prominence by the visit recently paid to them by the British Institution of Mechanical Engineers. Iron, of London, contains the following interesting account of them:

Seraing is situated on the River Meuse, about six miles above Liège. In 1817, the date when John Cockerill came there to erect his workshops, the population of the village amounted to 1930 inhabitants. Seraing lies on

weaving. Between 1818, the date of beginning work at Seraing, and 1823, when John Cockerill fixed his residence there, 43 steam engines had been made. They consisted of motors for spinning-mills, and of winding and pumping engines for collieries. From 1824 up to the Belgian revolution in 1830, the number of steam engines constructed amounted to 158, among them being one of 230 horse-power for the Dutch corvette Atlas. The circle of operations had extended. Blowing machinery, motors for iron works, steam corn mills, and especially marine engines, furnished the principal contingent of work. In 1829 the works of Seraing built a steamer with engines of 80 horse-power for the navigation of the Rhine from Cologne to Mainz. The Belgian revolution of 1830 completely stopped this forward movement by closing to the Belgian works the outlet of Holland. From 1833 to 1835, quiet being re-established, 53 engines were turned out, of which two were for pumping (100 and 200 horse-power respectively), and two were for boats (70 and 110 horse-power). There



The Chapin Pneumatic Process of Making Wrought Iron.—Fig. 2.—Plan Showing Arrangement of Converter and Ballers.

more homogeneous. While the aggregate of waste thus is perhaps somewhat in excess of the waste of the puddling process, it by no means approaches the amount saved per ton in labor and fuel. Thus, on the general question of economy of process, both the cost of the plant and the cost of working are on the side of this process.

This is a brief, but it is hoped a sufficiently extended, account of this new process to indicate its general scope and aim. A fuller and more elaborate discussion of the process in its scientific and economic relations, its relations to steel and to the wants of the industrial world, will shortly appear in pamphlet form, and may be had by those who wish to give it more critical study than we have yet had opportunity to undertake. The process is covered by an extensive series of patents in this country and also in Canada and Europe. The offices of the company are at 81 Clark street, Chicago, Ill.

Relay Working of Engines.

Some attention of late has been given to the subject of relay working of engines, and the question why locomotives cannot be run distances exceeding those covered at the present time was recently agitated by the Madras Government. An exchange, in referring to the subject, says that the locomotive superintendent of the South Indian line, who was the first to reply to the inquiry, expresses himself as being entirely opposed to keeping the engines on his line for any longer time than now customary, or to increase the usual running lengths, and thought that the adoption of such a course could not but be detrimental to the machinery, while precluding any possibility of fixing the responsibility. He was also of

be effected. One of these items referred to, the checking of which was rendered impossible when more than one set of men worked an engine. It would be impossible, for instance, to exercise any check when the first set delivered over charge, because of the great quantity of fuel still remaining on the tender—such quantities being necessary for the double run; the want of time also rendered it impossible. Under the proposed method no one could be held responsible for lack of economy in firing, while the want of efficient tests would help to encourage carelessness and deprive careful men of the just reward of their honest endeavors to economize. It has also been found from experience on the Madras Railway that new engines—which have always been worked through to their destination by relays of drivers—are nearly sure to suffer on the journey, from the irresponsibility involved in the relay system, the man who finally has had charge of the engine almost invariably reporting something wrong or hot, &c., which had to be rectified. This is something more than prejudice, the fact being that the men, under Mr. Trevethick's orders, always have taken a pride in their engines, and it was considered right and wise to encourage this feeling.

Mexican Iron Works.

A correspondent of a Philadelphia paper gives some interesting particulars relative to

as men and money can grade the road-bed and lay the rails, and several other railroads are expected to center at this point in the next three or four years.

Besides the iron business there are special openings here in other directions for enterprise and capital. If some of your Pennsylvania or New Jersey dairymen and truckers were here with men to raise cattle and poultry for this market, cultivate grapes and fruits and vegetables of all kinds, their operations could all be carried on jointly on one ranch, and a fortune would be assured in a very few years. There is a growing market here for produce of all kinds—milk, butter, eggs, chickens, beef, pork and fruits—and a well-fitted ranch to furnish them all can be had in the suburbs on favorable terms. Such a place could be operated to great advantage if transferred to energetic Northern hands. Half a dozen enterprising young men, with a few thousand dollars capital, each an expert in his own specialty, by combining their means and skill could readily get a foothold here under most favorable circumstances. What young men want is "opportunity," and that they do not always find in the old and thickly-settled portions of the Continent. There is a very kindly feeling here toward the United States. Border ruffians are not wanted, but reputable citizens and business men are cordially welcomed. On the 4th of July the Governor of the State ordered the Mexican flag to be hoisted on the public buildings, in honor of the anniversary of

the carboniferous formation which enters Belgium by Hainault, traverses it from west to east, and leaves the Belgian frontier by Henri-Chapelle and Welkenraedt. The coal formation, lying embraced from Charleroi to Namur in the valley of the Sambre, and from Namur to Liège in the valley of the Meuse, thins out in the latter district; the carboniferous limestone follows the left bank as far as Flémalle, then, dipping suddenly, throws up the coal seams on the right bank more numerous, thicker and richer than before. These beds underlie the whole of Seraing, where they were discovered about 1190. The old castle of Seraing, the date of the building of which is unknown, was acquired in 1817 by James and John Cockerill, for the establishment of workshops for the building of machinery, and for flax-spinning by the processes which they were then introducing into the country. Of these two men, then starting in the same

The production of the years from 1840 to 1843 only rose to the same total as in 1839—that is, 24 land engines, 31 locomotives, 3 marine engines and 3 steamboats; 1844 gave 12 land engines, 10 locomotives, 1 marine engine, 1 steamboat. In 1845 the movement was more considerable. The Cockerill Works were intrusted with the supply of one of the principal motors (240 horse-power) for the atmospheric railway at Saint Germain, near Paris. In 1848, owing to political events, there was an industrial crisis. Nevertheless, besides different engines, Seraing delivered during the same year six sea-going vessels and steamboats, the first for the Ostend and Dover service, the others for the navigation of the Rhine. In 1849, 1850 and 1851, 13 steamboats, besides 184 engines, left the Cockerill establishments. These engines included those sent to the exhibition of London,

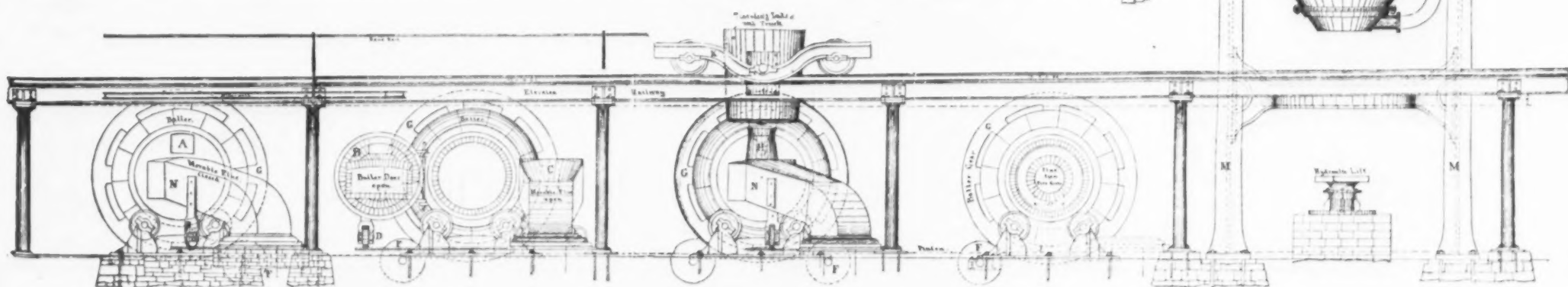


Fig. 3.—Front Elevation of Plant.

opinion that the introduction of the relay system would prove an effectual means of discouraging the men from taking any pride in, or care of, their engines. It is a fact that when men are intrusted with a given engine, they delight, as a rule, in keeping it in good order, and are careful lest any injury should occur to their charge; hence, a healthy rivalry springs up, which is fruitful of very good results, and which would be interfered with if the men were shifted about from engine to engine without being held directly responsible for any one of them. The relay system had been tried at home in several instances, all of which proved failures, and the locomotive superintendent was of the opinion that its introduction on Indian lines would be attended with failure also.

the erection of blast furnaces and foundries on Mexican territory. Writing from Durango under date of August 10, he says:

I write from the immediate vicinity of the Cerro de Mercado, the great iron mountain of Durango, that lifts itself up from the level plain, a huge mass of naked iron ore of the finest quality. It is a monumental pile of mineral wealth, larger and more valuable than "Cornwall," the celebrated Coleman estate, near Lebanon, Pa. It is owned by an incorporated company, in which prominent Pennsylvanians are interested. The company also own 13,000 acres of land adjoining the mountain, besides a splendid water-power, thus giving it all the essentials for what is destined to be one of the largest iron works in the world. This mountain of

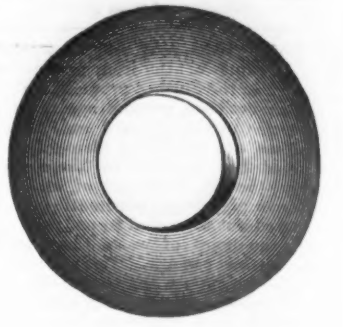
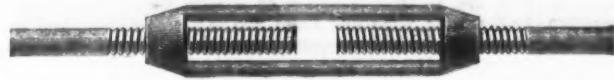
American independence, and the mayor of the city did the same with regard to the municipal buildings. Such acts of courtesy are very gratifying—all the more so because they are undoubtedly sincere.

A very interesting discovery was recently made in the course of the excavations carried on by the French school at Athens, on the Island of Delos. Near the theater of Apollo, a private house was discovered, probably of the Alexandrian period. A court surrounded by pillars and 12 rooms have thus far been revealed. The floor of the court is of beautiful mosaic containing flowers, fishes and other ornaments. A cistern filled with water occupies the middle of the court. The gates of the house and

career, the younger, John, was destined to elevate to a high degree of prosperity the locality in which he had established his residence, and fill the industrial world with his name. Liège, the country of his adoption, has given his name to one of its quays, Seraing to one of its streets. The latter has also erected to him a statue, and another has been erected of him at Brussels.

The establishment of Seraing has been the development, or rather the amplification, of the work done by Cockerill, the father, at the Jesuits' Bridge at Liège from 1802 to 1813, and by James and John Cockerill after that date. The workshops at Liège had carried out work of immense magnitude for those days, consisting chiefly of machinery for spinning wool and flax for the operations of

which obtained a grand medal. In 1851, at the Semmering competition, Seraing obtained the order for the locomotives. From 1852 to 1857, 236 land and marine engines and 150 locomotives left the Cockerill workshops; three Transatlantic steamers, of 2000 tons measurement each, were built, the Congress among others, which, on her first cargo voyage, made the run from London to Sydney in five days less than the best English vessels of the kind. From 1857 to 1865, 583 land engines, 206 locomotives, 100 steamboats, among them being two ironclad gunboats for the Russians, were produced. Among the machinery executed during this period were comprised the pumping engines (Wolff system) for the Bleyberg Company, and the boring



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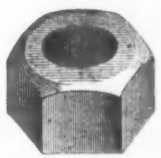
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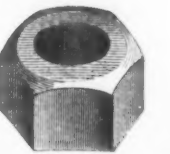
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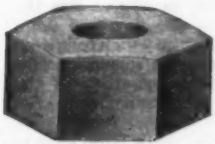
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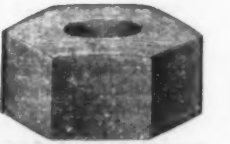
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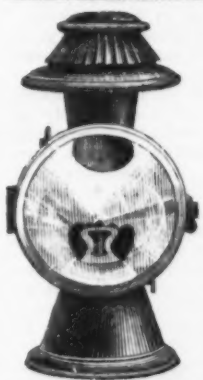
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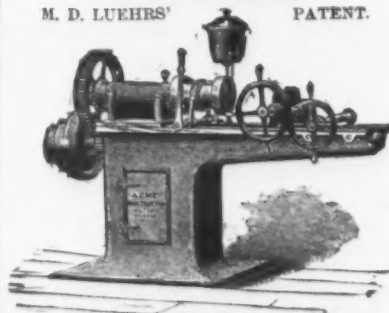
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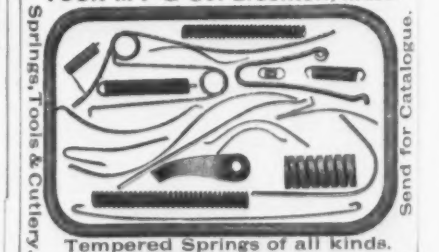
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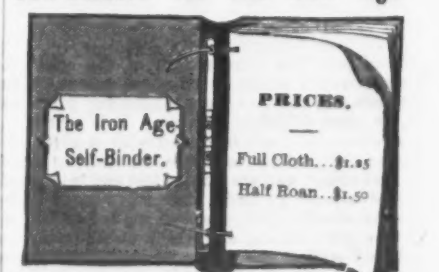
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machinery for the Mount Ceniz Tunnel; compressors, aerometers, wheels, and hydraulic presses, rock drills, drill carriages and in general all that which was invented, arranged or perfected by the eminent engineer Sommeiller for that great enterprise. From 1866 to 1883, in its mechanical department, in bridge-building work, in boiler-makers' work, independent of engines delivered in ships and steamboats, the Société Cockerill have executed 22,670 orders for other countries, in their different divisions of forges, machine shops, boiler shops and ship-building yards. The principal orders executed were composed of seven new mail boats (1866 to 1870) now running between Dover and Ostend; the first steamer built on the American system in Europe for the Volga; screw cargo steamers, whose consumption of coal per indicated horse-power per hour is 155 pounds; numbers of blowing engines (Seraing system); the mechanical plant of the steel works at Seraing, of the Ruhr and of divers Russian works; the steel works of the Compagnie des Forges de Châtillon et Commentry; of the Nord et Est de la France; of Saint Chamond and of Athus; bridges such as those over the Dniester, the Bug, and the affluents of the Volga; numerous apparatus for the compression of air and for drilling; compound engines, reversing engines, winding and pumping engines; iron-clad turrets, steel ordnance, &c.

The progress of the works of Seraing may be divided into three principal periods—the first starting from 1817 and finishing in 1840, on the death of John Cockerill; the second taking its course from the formation of the company for the exploitation of the Cockerill works (April 1842) to the year 1864; the third then spreading over the intervening time to the present. Cockerill's first colleagues were Martin Poncelet, then Pierre Wery, for mechanical construction; Gustave Pastor, attached to the house of Cockerill in 1817, then director of the iron works, and in 1829 director of the whole of Seraing works. This appointment terminated in 1866, after 37 years devoted to the extension of these works, to which Mr. Pastor brought vast knowledge, great prudence and consummate experience. Since 1866, the establishments of the Société Cockerill have been managed by Mr. Eugene Sadoine, administrator and director-general. Under his direction have been carried out the development of the Colard Colliery, the acquisition of two-thirds of the concession of the coal mines of Espérance, and the acquisition of the Somorrostro iron mines in Spain, the creation of a fleet of sea-going steamers for the transport of iron ore by sea and thence by canal; of pig iron and of the productions of the works to and from Seraing; the building and plant of the second foundry for machine castings; the blast-furnaces for making pig for the converters, and their connection on the level of the upper platform with the Appold ovens at the Colard Colliery, as well as with the depot for ore on the top of the slag mountain (the latter being in connection on the one hand, with the Namur and Liège Railway, and on the latter with the River Meuse, and accessible both ways by a service of locomotives); the creation of the new foundry, and of the new steel-rail mill; the first reversing engine for the plate mill; the enlargement of the old steel mill, the forges, the machine shops and boiler-making department; the construction of the bridge-building shop and its annexes; the creation of the shipbuilding yard at Hoboken (Antwerp) the refectories, workmen's houses, Prince's Avenue, the dispensary, the orphanage; schools for adults and for minors in the colliery department, and the naval industrial school at Hoboken; the institution of a pension fund for the employees, and the institution of a savings bank; finally, the suppression in 1868 of the employment of women in the interior of the company's collieries.

As remarked above, the Société Cockerill was founded in 1842 with a capital of about \$2,500,000, burdened with a mortgage debt to the state of \$600,000. In 1872, the capital was increased to \$3,000,000, and 6000 debentures of \$100 each were issued. Since 1866, not only the debt above mentioned has been repaid, but nearly \$5,000,000 has been spent in additions or improvements of all sorts, as will be seen further on. The deductions from profits, applied as depreciation on plants and tools, have been, from July 1, 1866 to June 30, 1882, \$4,609,180, which, joined to the additional capital of \$500,000, and debentures \$600,000, have covered, and more than covered, the disbursements on freeholds and buildings. By this expenditure the Société Cockerill have been able to augment their resources in coals and ore, double the means of production in certain departments, triple them in others, and put themselves at the head of progress in all branches of the trades in coal, iron, metallurgy, machinery and shipbuilding. The number employed in the works is about 11,000 persons, of whom 360 are officials; the motive power amounts to 15,000 horse-power. The annexed statement supplies in a tabular form a clear view of the great extent of the Seraing Works. Proceeding to give details, we notice first the Colard Pit, which is reached from the station by ascending an inclined plane. Two pits are sunk in this colliery; the Marie Pit replaces the old shaft; the Cecile Pit does the same for Henri-Guillaume shaft, filled up recently to make room for the steel works. From these two pits, at a depth of about 1740 feet, as many as 2000 tons of coal may be raised daily. Besides, in ordinary times, they admit of 5000 c. m. (1,100,000 gallons) of water being pumped out in the same time. Coal got from this pit is used for the coke ovens (Appold's system) situated at this colliery, at the steel works, and at the iron works. The total consumption of coal in all the departments is 4200 tons a day. The winding engine at the Marie Pit, using a steel-wire rope on a spiral drum, develops a force exceeding 1000 useful horse-power. No other of the kind exists in Belgium. As to the two rotary pumping engines, the type of which was invented in all its parts by the Société Cockerill, they each exert 250 net horse-power, in water raised, and are similar to those exhibited at the Paris Exhibition in 1878. The motor of the same kind exhibited at the Brussels Exhibition in 1880 was for the Mansfeld mines in Germany, and was of 1000 horse-power. The winding engine at the Cecile Pit, made in 1868 by the Société

Cockerill, came from the Morechamps Shaft, formerly the Espérance Colliery, of which two-fifths has been purchased by the society, and is now worked through the Colard Pit, with which it is in contact.

The company's coal is rich, and suitable for the manufacture of coke and to the requirements of metallurgical establishments. The concession comprises 307 hectares (753½ acres). There are 432 coke ovens (Appold's system) dependent on these collieries, which produce 360 tons of coke of the best quality per diem. On the inclined plane leading to the pit there is a small line of rails 1½ m. (about 5 feet) gauge, for locomotive and coke wagons; and a double-line narrow-gauge, worked by an endless chain coming from the pits, bringing coal in small trucks for the supply of the furnaces and the boilers of the steel works, foundry, rolling mills, forges, &c. On leaving the Colard Pit, we find to the middle of the inclined plane in question a branch line leading to a number of other inclined planes, arranged spirally around the bottom of the artificial mountain, created since 1820 by the continued deposits of slag, scoria, and rubbish. They run up to the top of the mountain, the large table land of which is leveled to form storage room for the materials (ore, flux, and coke) necessary for the supply of the blast furnaces. This mountain, inclosed, so to speak, in the middle of the works, occupied very valuable ground, and its encroachments every year became more and more serious, more especially as the increase of the blast furnaces and steel works required so much more room for the transport and reception of the materials than heretofore. Already, for this reason, the gasometer and coke ovens at the Henri-Guillaume Pit and the connection with the Seraing railway station were cleared away in 1870. In 1875 it was decided to close the Henri-Guillaume Pit, and in 1879 it became necessary to rearrange communications. It was thus that the transformation of the slag mountain and its arrangement as a platform for the storage of materials for the blast furnaces was resolved upon. It was

mountain. Nearly in front of the elevators are seen the coke ovens (Appold system), constituting a third calcining work; coal for these is supplied by the Caroline and Marie coal pits. Here are nine groups of ovens, which produce 140 tons of washed coke daily. After this we follow the canal by which barges bring ore to the basin in the interior of the works. By the side of this canal are to be found the pattern store, the delivery store, the general store and a store for timber. The general store, established in 1869 to constitute a depot for goods arriving from the exterior, and necessary for carrying on the works, such as oil, grease, cotton, copper, hemp, cables, &c., reckons up with the ore and pig iron a total turnover of 10,000,000 of francs per annum (about \$2,000,000). We must not forget to mention the yard for building iron river boats, installed on the bank of the river, nor the enormous depots of timber of different sizes destined for the support of the roads in the coal pits, nor the store for the products of the rolling mills and steel works, established in 1867 and 1879, and intersected by railways, admitting storage, rapid manipulation by steam cranes, or the cheap loading by barge or wagon. While on this subject, attention must be drawn to the new basin constructed in 1871 for the discharge of timber and other products brought by the Meuse. The consumption of timber in the collieries amounts annually to nearly 500,000 francs (\$100,000).

The visitor now arrives at the castle of Seraing, which comprises the residence of the director-general, the library, the archives, the room reserved for the general meeting of shareholders (where in olden times the States General of the Prince Bishop of Liège held their sittings) and the ancient princely bedchamber. In going through the courtyard, on the right, are the stable yards and coach houses; on the left, a garden of 4 hectares, a portion of the ancient park. At the bottom will be seen a large wing parallel to that of the entrance and surmounted by a carving of the arms of Holland, a mark of respect rendered by Cockerill to his partner,

in steel of 24 cm. (9½ inches) caliber, and heavy forgings. There are also other hammers of less importance. The small forge comprises, since 1870, hammers for the manufacture of wheels for locomotives and railway wagons, &c., and a lathe shop for rough turning the forgings. A large dining-room, with white marble tables, is placed between the hammer-shop and forge. Similar rooms exist in all departments for workmen who do not live in Seraing. These latter date from 1866, after the cholera epidemic. All that remains of the old boiler-shop are the two large shops for the erection of boilers. The shop for plate flanging and for the preparation of other parts of boilers was rebuilt only in 1874. The large bridge-building shop and its annexes have been erected since 1880. Two of the three old blast furnaces make pig iron from Luxembourg ore. The third makes hematite pig from the Spanish and Algerian ores, as do also the four new furnaces at the steel works. They produce on an average about 50 tons of pig a day. The large horizontal blowing engine, dating from 1860, was transformed into a compound engine in 1880; its force is about 300 horse-power. These furnaces might be connected with the upper ore platform, similar to those at the steel department; and the Luxembourg ore arriving by railway might be advantageously transported on to the platform in close proximity to the mouths of the furnaces. The inclined planes used for elevating the slag and scoria from the iron mill were made in 1875.

The steel works comprised in 1866 only one 5-ton converter, and a rolling mill for rails and tires. With the exception of the old rail and tire mill, all the rest of this department has been constructed since 1866. The old foundry is transformed into a Siemens-Martin furnace shop. Of the four blast furnaces alight, Nos. 1 and 2 were erected in 1871-72. They were restored in 1881, and elevated to the same height as Nos. 3 and 4, constructed in 1880-81. These four furnaces produce each 70 tons of pig for steel making daily, and the metal can be

1868. A new plate mill is in course of construction. The different buildings have also been renewed, and steam hammers of the best system have replaced the old tools. The iron works of Seraing, one of the largest in the country, may also be considered one of the best, and at the head of modern progress.

In order to transport the different materials about the works, the following additions have been made since 1866: Fifty kilometers (31 miles) of railway of standard gauge have been laid, 30 locomotives and 360 wagons have been put in use, and have carried from July 1, 1881, to July 2, 1882, 1,400,000 tons of product or of waste materials. Besides the works of Seraing, the company possesses, since 1866, two-fifths of the Espérance Colliery, two-sevenths of the mines of the Société Franco-Belge des Mines de Somorrostro, near Bilbao (capable of producing annually 450,000 tons of ore free from phosphorus, and containing on the average about 55 per cent. of iron), and 50 hectares of mineral royalties in Luxembourg. They also possess eight steamers built by themselves, each of which carries 1350 tons of ores or other goods, and two steam barges navigating the canals between Antwerp and Liège, carrying each 350 tons. Finally, they possess the shipbuilding yard at Hoboken, near Antwerp, capable of building or dry-docking the largest vessels. These latter acquisitions, of a total value of about \$1,200,000, together with the richness of their collieries and mines, and the extent of their means of production and transport, render the Société almost without a rival in Europe.

It only remains to be added that, as the Société are not behind other large industrial establishments in Belgium—and, for that matter, in the world—as regards the foundation of institutions having the well-being and prosperity of their employees for their object, so has it ever been the endeavor of the administration to place the means of intellectual advancement at their disposal. In 1817, the date of the arrival of Cockerill at Seraing, the population of the commune was 2000 souls, and the revenues amounted to about \$1200 per annum. Owing to the development of the Cockerill establishments, the population and revenues increased. Instead of the 4900 persons composing the population in 1842, the date of the Société Cockerill, there are now 25,000; and the revenues of the commune, which were about \$3000 in 1842, amounted to some \$84,000 in 1882. This accession of revenue, due in great part to the development of the Société Cockerill, allows the parish authorities to develop education and create schools. In 1860 there were only two schools in Seraing and its vicinity, frequented by 600 scholars; in 1880 there were seven, with two middle-class schools, one for boys and the other for girls, and the number of scholars who then received instruction was 5860. Besides this, the Société in 1857 suggested the creation of an industrial school, to which they accorded large subsidies. They also authorized their engineers to give special lectures in the school, and their chief mechanical engineer, Mr. Kraft, forms part of the administrative commission. The school numbers 300 pupils, and produces the best foremen in all branches of metallurgical industry. The Société Cockerill likewise created in 1880 a school for the formation of foremen miners. This school is directed by the chief mining engineer of the Cockerill pits, and numbers at present 73 attendants. That it has not more is owing to primary instruction being less developed among the pit population than in that which works above ground. Hence, to force parents to send their children to school, the Société Cockerill has decreed for the last six years that instruction shall be compulsory upon children of 12 to 15 years of age who wish to enter their service. To maintain primary instruction among the colliery population, it has created preparatory classes for the school of miners at the different collieries. In 1880 these classes were frequented by 137 pupils. In conclusion, an industrial school has also been established at Hoboken for the workmen in the shipbuilding yard, as well as preparatory classes for the same.

The New Postal Notes.—The new postal notes, which do away with the trouble of procuring money orders, and afford an easy method of mailing any sum less than \$5, went into use September 3 at the New York Post Office, and Postmaster Pearson declared that the system had proved a success. The notes are made of thin paper, and, unlike silver or postage stamps, cannot be detected in a letter. In each of the 80,000 books printed to supply the 6500 money-order offices in the country are 500 notes, and when one of the notes is issued there remains on the stub the amount and name of the person to whom it is directed, also the post office address.

On the 1st of October the Post Office Department will substitute a new general mail lock for that now in use. The new lock is made of corrugated steel, is lighter, stronger and safer than that now employed, and is manufactured by the Smith & Egge Lock Co., of Connecticut. The new locks and keys have been tested for some time past by the clerks in the Mail Equipment Division of the Post Office Department, and are now being distributed throughout the country. Some 50,000 keys were sent out in separate registered letters to postmasters and other persons authorized to hold them. When the receipts for the keys had been returned, locks were distributed, and the work was recently completed. The change of mail locks is made only once in 10 years.

The Union Shuttle Company is the name of a new industry just started at East Boston, with a capital stock of \$100,000. The company own two letters-patent for improvements in loom shuttles, which in the opinion of leading manufacturers and mill men are of sufficient importance to nearly, if not quite, control the shuttle trade, and would seem to be important.

The American Exposition of the Manufacturers' and Mechanics' Institute, at Boston, was opened with appropriate ceremonies on September 5.

The autumn meeting of the British Iron and Steel Institute will be held on the 18th, 19th and 20th of September at Middlesbrough.

THE SERAING WORKS OF THE SOCIÉTÉ COCKERILL, BELGIUM.

Department.	Office: s and workmen.	Engines.		Particulars.	Productions.
		?	Horse-power.		
1. Coal pit Colard, with 2/5 Espérance.	3,080	47	1,604	3 collieries at work.	Tons.
2. Coal pit Caroline and Marie.				Coke ovens.	Fuel. 394,089
3. Mines.	960	13	212	24 groups Appold, 432 furnaces, pulverizers.	Coke. 142,857
4. Blast furnaces.	430	13	490	Mines in Belgium, Liège district, Namur, Luxembourg; in France, Meurthe-et-Moselle district; in Spain and Somorrostro.	Min-erals { Belgium-Luxembourg 83,743 Foreign 177,338
5. Foundries.	320	8	88	7 furnaces at work: 2 ordinary pig iron, and 5 hematite.	Pig iron { Ordinary. 29,556 Hematite. 93,596
6. Iron works.	970	70	2,584	Foundries for cast iron, steel and copper.	Castings. 5,911
7. Steel works.	1,540	75	5,139	40 double puddling furnaces; reheating and welding furnaces; 13 rolling mills; 7 steam hammers.	Plates, joists, bars, &c. 25,615
8. Forges.	250	27	489	8 converters; 30 reheating furnaces; 9 rolling mills; 8 hammers.	Rails, tires, bars, plates, guns 78,890
9. Fitting-shops.	1,460	21	433	14 fires; 17 hammers, from 3 to 30 tons; 80 forges; wheel lathes.	Forgings. 1,772
10. Boiler and bridge shops.	750	14	243	434 lathes, planing machines, drills, slot-ers, screwing machines, &c.	Tools and mechanical appli-ances. 7,859
11. Shipyard, Hoboken.	550	6	86	70 lathes, planing machines, drills, hydraulic riveters, flanging machines, furnaces and hammers.	Boilers, bridges and roofs. 9,850
12. Transports, &c.	430	43	3,220	Special tools for shipbuilding, joinery, sawmills; large dry-dock.	Sea-going and river steam-ers, tugs, dredges, &c.
Administration offices.	370			8 steamers of 1200 tons; 2 steam barges of 400 tons; 30 locomotives; 50 kms. of railway.	Traffic moved. 1,183,000
	11,110	337	14,588	Medical service, pharmacy, hospital or-phanage; 250 beds, 4 hectares of garden, workmen's dwellings, classes for children of 12 years of age and above, and preparatory schools for miners, and industrial school at Hoboken, all belong-ing to the society.	

therefore a vast and important work, as much from the difficulties encountered as from the results obtained; the surface occupied by this mountain is considerable, and its height extends 35 m. (114 feet) above the level of the Meuse. The 15 hectares of land that this improvement has placed at the disposition of the society could not have been obtained save at great expense, the last land, which was bought in 1870, at the western end of the works, costing about 25,000 francs the hectare (about \$2000 per acre). Leaving the aforesaid platform, and following the curves of the railway round the mountain, the gas works erected in 1870 appear, where gas from the refuse of petroleum is made. The installation of these gas-works has been of great service to the fitters and workmen employed, the light given by petroleum being more brilliant and more steady than the ordinary coal gas, which tires the sight. We then come to the Caroline Pit, with its group of coke ovens (Coppée system), recently acquired by the society. Further on, and coming to level ground, there appears a range of workmen's dwellings, erected by the society on the banks of the Meuse, in 1871, in a position well supplied with air, water and light. They are for special workmen engaged in the rolling-mills, and are opposite the locomotive sheds and the stables which give shelter for 30 horses.

The road follows the banks of the Meuse through the different stores of steel rails, timber for coal pits, iron from the rolling mills, and especially for the Algerian and Spanish ores, which come from Antwerp by canal. The powerful steam elevators, erected in 1873 on the crest of the river bank, enable the ore to be quickly unloaded, and would be more generally made use of if barges had not to pay an excessive toll of 1.05 francs (about 20 cents) per ton on the Campine Canal, which renders transport by water too expensive. The ore also comes by the State railway, to which it brings more than 1,000,000 of francs annually for carriage, without counting the transport of the products of the works or iron ore from Luxembourg. On arrival at the Seraing railway station, the ore trucks are taken by the company's locomotives toward the depot on the top of the slag mountain. If by water, the ore is lifted by the elevators and deposited either in iron inclosures stretching alongside the Meuse, or in tip-wagons, by which it is taken to the stacks established on the slag

King William I. This wing incloses the office of the secretary-general and the offices of the company. Among these are on one side the drawing offices, under the immediate direction of the chief engineer, who has between 45 and 50 engineers and draftsmen under him; on the other side, the board and committee rooms of the council of administration and the office of the director-general; then come the pattern shop and photographic studio. The fitting shops are next entered. Workshop No. 1 was built in 1871. The roof, on the Raikem system, has since been copied by the State and by the Northern Railway Company. It had not been used till then except for spinning mills. It represents the advantages of an equal distribution of light and air in every part, which is very advantageous for fitting work and for the health of the workmen, consequently tending to an increase of production. The buildings forming the left wing inclose the pattern shop, established in 1872, which is shop No. 2. Workshop No. 3, as regards arrangement and tools, was not up to the standard of the day, and has been enlarged and rearranged successively in 1879 and 1881. Workshop No. 4, or the locomotive shop, was enlarged and modified in 1864. Workshop No. 5 did not exist before 1866, except the northern half of the great nave; the other half was erected in 1874, and the buildings adjoining, with Raikem roofs, were added in 1875. It is here that the large land and marine engines are erected. This building is lighted by night by the electric light, which is very favorable for fitting work. Workshop No. 6 is the bolt and nut making department. This shop was erected in 1867, and since then the tools have been considerably increased. In the courtyard are seen the large new traveling crane, with fixed steam winch, and other lifts. The lifting cranes in the workshops are all worked by compressed air. We now reach the Marie Pit. This colliery was created in 1856, the pits being sunk by compressed air. Here was established in 1875, for the first time in Belgium, a central condensation of the steam from the various motors by the means of a special condenser. It comprises an air-compressor engine, put down in 1871 to work the drills at the Caroline and Colard pits. The centrifugal ventilator was erected in 1878, and is the first of the system.

The forge and steam hammer department contains a steam-hammer of 25 tons mounted, erected in 1877, capable of forging cannon

run direct from them into the converter. The consumption of these furnaces in foreign ore is equal to from 180,000 to 200,000 tons and the production of pig about 100,000 tons per annum. The three large blowing engines which supply the blast have a collective power of 600 horse-power. Two are sufficient for four furnaces; the third is held in reserve. Nearly 160 of these engines have come from the workshops of Seraing. The Bessemer department comprises four converters. The last pit is capable of producing about 300 tons of steel per day. The Bessemer blowing engines are also on the Cockerill system. The rail mills have produced in 1878 as much as 2054 tons of rails in five days. The direct-acting reversing gear is the invention of the society, which have supplied several to Germany, Russia, France and England. The tire mill is able to make tires of nearly 2 m. in diameter, as well as those for wagons.

The foundry department consists of three large buildings, of which the two principal ones have been built since 1866, following out all hygienic rules applicable to the molders' industry. They are provided with means of transport, and for lifting weights, which allow of a considerable reduction in cost price. Since 1866 the brass foundry, sand store, coremakers' shops, &c., have also been erected on the west side of this department. The different articles which the foundries have sent to the exhibitions of London, Paris, Brussels, Sydney and Melbourne have been the admiration of good judges. We may mention, for instance, the blocks of chilled cast metal exhibited at Brussels in 1880. This metal seems to be definitely adopted in Belgium for armored turrets and batteries. This department, including the iron works, is perhaps the division that has undergone the least transformation since 1866, and that because of the increasing development of the steel works. Nevertheless, important improvements have also been made here. Dating from 1868, all the motors have been fitted with condensing apparatus, and boilers heated by coal have disappeared, steam being produced by the waste heat from the puddling and reheating furnaces. Besides, a train of rolls for large bars and rolled girders, with an engine of 280 horse-power, has been added, and the plate mill, having become obsolete, has been transformed and attached to a powerful reversing engine (the first on the Continent) of 550 horse-power, constructed in the works in

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This sale will comprise large invoices of Hardware, Edge Tools, Chisels and Files direct from the manufacturers. Also special sale of Table (firsts and seconds) and Pocket Cutlery, Carvers, Butcher Knives, Breach-Loading Guns, Spoons, Plated Spoons, Forks and Knives, &c., &c.

Particulars in next week's issue of the Iron Age. All invoices must be in by the 25th inst.

For Sale.

TWO BLOWERS, Alden & Dimpfel, 48-in. Will be sold cheap. For price, &c., address

SITES & GILL,

222 and 224 So. Third Street, Philadelphia, Pa.

Wanted.

A gentleman, with acquaintance, thorough mechanic and excellent references as to business ability, desires to represent some substantial manufacturing concern.

Address: "BUSINESS,"

Office of The Iron Age, 36 Clark St., Chicago, Ill.

Wanted.

An experienced Pig Iron Salesman. One acquainted with Western Trade preferred.

Address: "X. Y.,"

Office of The Iron Age, 36 Clark St., Chicago, Ill.

WANTED: By a young man of 25 years, a situation: salesman prefer. Have been connected with a large Iron Importing House who are about retiring from business, in Philadelphia. Address

"M. L.,"

Railway Station Swansea, South Wales.

AN INTEREST

May be secured in Improved Horse Nail Forging Machine, saving 20 per cent. in cost of production.

Address: "ENTERPRISE,"

Car of J. GASTON, 15 Wall St.

HARDWARE BUSINESS FOR SALE

The entire stock and good-will of the Wm. H. Shepard Hardware business, at Bath, N. Y., is now offered for sale. If not sold at private sale before the 1st day of September, 1883, I will, on that day, at one o'clock, P. M., sell the entire property at public auction. The location of store is the best in Bath, and rent reasonable. For particulars, apply to

HENRY FAUCETT, Assignee, &c.

Bath, N. Y., Sept. 8, 1883.

TO RENT.

Desirable Offices, first and second floors, No. 267 So. 4th St., Philadelphia.

SCREEN & CONNOR,

First Floor Back.

Special Notices.

SECOND-HAND AND NEW MACHINERY.

July 19.

One Corliss Beam Condensing Engine, 30 in. x 72 in.
One Horizontal Corliss Engine, 16 in. x 42 in.
One Horizontal Corliss Engine, 12 in. x 30 in.
One Horizontal Corliss Engine, 10 in. x 22 in.
One Horizontal Corliss Engine, 8 in. x 16 in.
One Horizontal Engine, 12 in. x 16 in.
One Horizontal Engine, 8 in. x 12 in.
One Horizontal Engine, 6 in. x 10 in.
One Horizontal Engine, 4 in. x 8 in.
One Horizontal Engine, 3 in. x 6 in.
One Horizontal Engine, 2 in. x 4 in.
One Horizontal Engine, 1 in. x 2 in.
One Horizontal Engine, 1/2 in. x 1 in.
One Horizontal Engine, 1/4 in. x 1/2 in.
One Horizontal Engine, 1/8 in. x 1/4 in.
One Horizontal Engine, 1/16 in. x 1/8 in.
One Horizontal Engine, 1/32 in. x 1/16 in.
One Horizontal Engine, 1/64 in. x 1/32 in.
One Horizontal Engine, 1/128 in. x 1/64 in.
One Horizontal Engine, 1/256 in. x 1/128 in.
One Horizontal Engine, 1/512 in. x 1/256 in.
One Horizontal Engine, 1/1024 in. x 1/512 in.
One Horizontal Engine, 1/2048 in. x 1/1024 in.
One Horizontal Engine, 1/4096 in. x 1/2048 in.
One Horizontal Engine, 1/8192 in. x 1/4096 in.
One Horizontal Engine, 1/16384 in. x 1/8192 in.
One Horizontal Engine, 1/32768 in. x 1/16384 in.
One Horizontal Engine, 1/65536 in. x 1/32768 in.
One Horizontal Engine, 1/131072 in. x 1/65536 in.
One Horizontal Engine, 1/262144 in. x 1/131072 in.
One Horizontal Engine, 1/524288 in. x 1/262144 in.
One Horizontal Engine, 1/1048576 in. x 1/524288 in.
One Horizontal Engine, 1/2097152 in. x 1/1048576 in.
One Horizontal Engine, 1/4194304 in. x 1/2097152 in.
One Horizontal Engine, 1/8388608 in. x 1/4194304 in.
One Horizontal Engine, 1/16777216 in. x 1/8388608 in.
One Horizontal Engine, 1/33554432 in. x 1/16777216 in.
One Horizontal Engine, 1/67108864 in. x 1/33554432 in.
One Horizontal Engine, 1/134217728 in. x 1/67108864 in.
One Horizontal Engine, 1/268435456 in. x 1/134217728 in.
One Horizontal Engine, 1/536870912 in. x 1/268435456 in.
One Horizontal Engine, 1/1073741824 in. x 1/536870912 in.
One Horizontal Engine, 1/2147483648 in. x 1/1073741824 in.
One Horizontal Engine, 1/4294967296 in. x 1/2147483648 in.
One Horizontal Engine, 1/8589934592 in. x 1/4294967296 in.
One Horizontal Engine, 1/17179869184 in. x 1/8589934592 in.
One Horizontal Engine, 1/34359738368 in. x 1/17179869184 in.
One Horizontal Engine, 1/68719476736 in. x 1/34359738368 in.
One Horizontal Engine, 1/137438953472 in. x 1/68719476736 in.
One Horizontal Engine, 1/274877906944 in. x 1/137438953472 in.
One Horizontal Engine, 1/549755813888 in. x 1/274877906944 in.
One Horizontal Engine, 1/1099511627776 in. x 1/549755813888 in.
One Horizontal Engine, 1/2199023255552 in. x 1/1099511627776 in.
One Horizontal Engine, 1/4398046511104 in. x 1/2199023255552 in.
One Horizontal Engine, 1/8796093022208 in. x 1/4398046511104 in.
One Horizontal Engine, 1/17592186044416 in. x 1/8796093022208 in.
One Horizontal Engine, 1/35184372088832 in. x 1/17592186044416 in.
One Horizontal Engine, 1/70368744177664 in. x 1/35184372088832 in.
One Horizontal Engine, 1/140737488355328 in. x 1/70368744177664 in.
One Horizontal Engine, 1/281474976710656 in. x 1/140737488355328 in.
One Horizontal Engine, 1/562949953421312 in. x 1/281474976710656 in.
One Horizontal Engine, 1/1125899906842624 in. x 1/562949953421312 in.
One Horizontal Engine, 1/2251799813685248 in. x 1/1125899906842624 in.
One Horizontal Engine, 1/4503599627370496 in. x 1/2251799813685248 in.
One Horizontal Engine, 1/9007199254740992 in. x 1/4503599627370496 in.
One Horizontal Engine, 1/18014398509481984 in. x 1/9007199254740992 in.
One Horizontal Engine, 1/36028797018963968 in. x 1/18014398509481984 in.
One Horizontal Engine, 1/72057594037927936 in. x 1/36028797018963968 in.
One Horizontal Engine, 1/144115188075855872 in. x 1/72057594037927936 in.
One Horizontal Engine, 1/288230376151711744 in. x 1/144115188075855872 in.
One Horizontal Engine, 1/576460752303423488 in. x 1/288230376151711744 in.
One Horizontal Engine, 1/1152921504606846976 in. x 1/576460752303423488 in.
One Horizontal Engine, 1/2305843009213693952 in. x 1/1152921504606846976 in.
One Horizontal Engine, 1/4611686018427387904 in. x 1/2305843009213693952 in.
One Horizontal Engine, 1/9223372036854775808 in. x 1/4611686018427387904 in.
One Horizontal Engine, 1/18446744073709551616 in. x 1/9223372036854775808 in.
One Horizontal Engine, 1/36893488147419103232 in. x 1/18446744073709551616 in.
One Horizontal Engine, 1/73786976294838206464 in. x 1/36893488147419103232 in.
One Horizontal Engine, 1/147573952589676412928 in. x 1/73786976294838206464 in.
One Horizontal Engine, 1/295147905179352825856 in. x 1/147573952589676412928 in.
One Horizontal Engine, 1/590295810358705651712 in. x 1/295147905179352825856 in.
One Horizontal Engine, 1/1180591620717411303424 in. x 1/590295810358705651712 in.
One Horizontal Engine, 1/2361183241434822606848 in. x 1/1180591620717411303424 in.
One Horizontal Engine, 1/4722366482869645213696 in. x 1/2361183241434822606848 in.
One Horizontal Engine, 1/9444732965739290427392 in. x 1/4722366482869645213696 in.
One Horizontal Engine, 1/18889465931478580854784 in. x 1/9444732965739290427392 in.
One Horizontal Engine, 1/37778931862957161709568 in. x 1/18889465931478580854784 in.
One Horizontal Engine, 1/75557863725914323419136 in. x 1/37778931862957161709568 in.
One Horizontal Engine, 1/151115727451828646838272 in. x 1/75557863725914323419136 in.
One Horizontal Engine, 1/302231454903657293676544 in. x 1/151115727451828646838272 in.
One Horizontal Engine, 1/604462909807314587353088 in. x 1/302231454903657293676544 in.
One Horizontal Engine, 1/1208925819614629174706176 in. x 1/604462909807314587353088 in.
One Horizontal Engine, 1/2417851639229258349412352 in. x 1/1208925819614629174706176 in.
One Horizontal Engine, 1/4835703278458516698824704 in. x 1/2417851639229258349412352 in.
One Horizontal Engine, 1/9671406556917033397649408 in. x 1/4835703278458516698824704 in.
One Horizontal Engine, 1/19342813113834066795298816 in. x 1/9671406556917033397649408 in.
One Horizontal Engine, 1/38685626227668133590597632 in. x 1/19342813113834066795298816 in.
One Horizontal Engine, 1/77371252455336267181195264 in. x 1/38685626227668133590597632 in.
One Horizontal Engine, 1/154742504910672534362390528 in. x 1/77371252455336267181195264 in.
One Horizontal Engine, 1/309485009821345068724781056 in. x 1/154742504910672534362390528 in.
One Horizontal Engine, 1/618970019642690137449562112 in. x 1/309485009821345068724781056 in.
One Horizontal Engine, 1/1237940039285380274899124224 in. x 1/618970019642690137449562112 in.
One Horizontal Engine, 1/2475880078570760549798248448 in. x 1/1237940039285380274899124224 in.
One Horizontal Engine, 1/4951760157141521099596496896 in. x 1/2475880078570760549798248448 in.
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One Horizontal Engine, 1/19807040628566084398385987584 in. x 1/9903520314283042199192993792 in.
One Horizontal Engine, 1/39614081257132168796771975168 in. x 1/19807040628566084398385987584 in.
One Horizontal Engine, 1/79228162514264337593543950336 in. x 1/39614081257132168796771975168 in.
One Horizontal Engine, 1/158456325028528675187087900672 in. x 1/79228162514264337593543950336 in.
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One Horizontal Engine, 1/20282409603651670423947251286016 in. x 1/10141204801825835211973625643008 in.
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One Horizontal Engine, 1/81129638414606681695789005144064 in. x 1/40564819207303340847894502572032 in.
One Horizontal Engine, 1/162259276832213363391578010288128 in. x 1/81129638414606681695789005144064 in.
One Horizontal Engine, 1/324518553664426726783156020576256 in. x 1/162259276832213363391578010288128 in.
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One Horizontal Engine, 1/1298074214657706907132624082305024 in. x 1/649037107328853453566312041152512 in.
One Horizontal Engine, 1/2596148429315413814265248164610048 in. x 1/1298074214657706907132624082305024 in.
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One Horizontal Engine, 1/2658455991618983745807614120560689152 in. x 1/1329227995809491872903807060280344576 in.
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One Horizontal Engine, 1/42535295865903739932921825928971026432 in. x 1/21267647932951869966460912964485513216 in.
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One Horizontal Engine, 1/34844914373348343753049559801013064851456 in. x 1/17422457186674171876524779900506532425728 in.
One Horizontal Engine, 1/69689828746696687506099119602026129702912 in. x 1/34844914373348343753049559801013064851456 in.
One Horizontal Engine, 1/13937965

Special Notices.

For Sale or Lease.

A Large Two-Story Brick Factory.

formerly Machine Works, at Pearl River, N. Y., on railroad depot, 25 miles from New York City. Railroad facilities unexceptionable, on the line of the New Jersey and New York Railroad. The property contains 40,000 square feet floor space, with one 80 h. P. Engine and Boiler, 700 ft. 2-inch line shafting and pulleys, main belt, steam heat and water pipes throughout the building. A spiral iron foundry, 70 ft. by 50 ft., with one iron smelting cupola with Mackenzie blower, brass furnace, core oven, blacksmith shop, pattern vaults, annealing oven, etc. The property can be bought or leased on liberal terms. For further particulars, price, terms, etc., address

J. E. B. & Co.,
113 Liberty St., New York City,
or Pearl River, Rockland Co., N. Y.

For Sale.

The largest stock of New and Second-hand Engines, Boilers, and general Machinery in the West. Send for Catalogue. Hoisting Outfits for Coal Mining and other purposes a specialty.

WARREN SPRINGER,
195 to 219 South Canal St., Chicago.

For Sale.

Second-hand

DROPS and LIFTERS.

BEECHER & PECK,
Lock Box 122, New Haven, Conn.

STEAM PUMPS

For Sale.

A large number of Steam Pumps of all makes, and ranging in size from small tank or boiler feeds up to very heavy service engines. While the stock lasts good bargains are open for miners, Water Works, Rolling Mills, Furnaces, or any one needing to move fluids by steam. Call upon or address

JNO. A. HINCKLEY,
Purchasing Agent of the United Pipe Lines,
Oil City, Pa.

For Sale.

MACHINES FOR MAKING PICKS, MATTOCKS AND AXES.

With Solid Punched or Adze Eyes.

T. & CO., Box 25,

Office of The Iron Age, 83 Reade St., New York.

For Sale.

TREBLE AND DOUBLE-GEARED 25-INCH ENGINE LATHES, from new patterns.

GEORGE A. OHL & CO.,

East Newark, N. J.

FOR SALE.

The extensive Foundry and Machine Shops formerly owned by Clute Bros., adjoining the Erie Canal, and at the junction of the several railroads centering here, are offered for sale on reasonable terms. On the premises are Engine, Boiler, Cupola, Line Shafting, Steam Heating Pipes, Frames, Dormant Scales, &c. For further information, address, H. S. EDWARDS, For Mohawk National Bank, Schenectady, July 24, 1883.

For Sale.

The half interest in a Wholesale and Retail Hardware business in the City of Jacksonville, Florida. Sales last year, \$250,000. Inquire of Holbrook Bros., 87 Beekman St., New York City; Perry & Co., Albany, N. Y.; McConnell & Co., Hornellsville, N. Y.; and of the proprietors, BENEDICT & MC CONIHE, Jacksonville, Florida.

VALUABLE PROPERTY FOR SALE.

The Hardware Works, Tenth and Spruce Streets, Reading, Pa., consisting of Foundry, Machine Shops, Warehouse, and other buildings, machinery, etc., all in first class running order. One entire block of ground. Ample room for extension. Will be sold on easy terms. Apply to

F. C. SMINK,
Reading, Pa.

Valuable Property for Sale.

Machine Shop, Foundry, Blacksmith Shop, with Forge Hammer; Saw Mill, Paint Shop, Two Dwelling houses, with all necessary out-buildings, including 18 acres of land and water right. Situated on Antietam Creek, a never-failing water-power, three miles south of Waynesboro', Franklin Co., Pa. Will be sold on easy terms. Apply to

GARVER, FOLTZ & CO.,
Hagerstown, Md.

To Lease.

From May 1, 1884, for a term of years, at a low rent to satisfy parties the many, a large property at New London, Conn., lately occupied by the Brown Cotton Gin Company. The ground comprises over 80 acres square feet. The buildings and sheds under roof measure over 25,000 square feet, of which about 20,000 square feet are metal roofs. An Engine, Boiler, shafting, &c., &c., are on the premises. The property is very conveniently located for manufacturing purposes. Its entire eastern line is bounded by the land of the Shore Line Division of the N. Y., N. H. and Hartford R. R. Co.

For further particulars, apply to
Messrs. J. C. LEARNED & SON,
New London, or to
B. HAXTUN,
173 Centre St., New York.

Wanted.

A Partner with \$500 to \$10,000 in a Foundry and Machine Business, established in 1824. For particulars, inquire of

L. H. COLLIER,
Poughkeepsie, N. Y.

To Brass Foundries.

To Brass Manufacturers.

Our new foot press, for cutting off GATES from brass castings by foot power, is now ready. Weight, 220 lbs. Price complete, \$30. net. A boy can operate it easily. We warrant them to give the most perfect satisfaction. FREEBORN, FURCH and SHARPE CO., 12 W. 1st St., New York.

A PRACTICAL Roller of 12 years' experience is open for engagement. Either Bar or Guide Mill. Strictly temperate habits, and can produce first-class references.
Address
"ROLLER, 49,"
Office of The Iron Age, 83 Reade St., New York.

Special Notices.

NEW AND SECOND-HAND MACHINERY.

One Iron Planer, 16 ft. x 60 in.

One Iron Planer, 7 ft. x 32 in.

One Screw-cutting Lathe, 11 ft., 18 in. swing.

One Screw-cutting Lathe, 16 ft., 24 in. swing.

Two Lincoln Milling Machines.

One Smith & Garvin Machine.

One 3-Spindle Upright Drill.

One 25-in. Back Geared Drill.

Three Edging Machines.

One 12 x 42 in. Corliss Engine.

One 50 H.-P. Return Tubular Boiler.

One 60 H.-P. Locomotive Boiler.

One 8 H.-P. Hoisting Engine and Boiler.

One 26-in. Endless Bed Planer.

One 24-in. Gray & Woods Planer, with Feed Rolls.

HENRY I SNELL,
135 N. 3d Street, PHILADELPHIA.

For Sale.

Palo Alto Rolling Mills.

Near Pottsville, Pa.,

ON THE MAIN LINE OF THE POTTSVILLE

AND READING RAILROAD.

These mills are in good repair, and can be started in two days' time.

Rolls for T-Rails 12 to 70 lbs. per yard, and for Street Rails 18 to 70 lbs. per yard.

Guide Mill Train for Merchant Iron 1/2 to 1 inch.

Rolls for Merchant Bar, round and square, up to 4 1/2 inches.

Number of Puddling Furnaces in both mills, 30; Heating Furnaces, 9; all with boilers attached.

Also Foundry, Machine Shop, Blacksmith Shops, Iron House, Roll House, Carpenter and Pattern Shops, Stables, handsome Dwelling for Superintendent, 21 Tenement Houses, a Brick Office, and ample grounds for stock and cluder.

For further particulars address

Messrs. LEE & McCAMANT, Extrs.,

Pottsville, Pa.

THOS. F. WRIGHT, 1804 Race St., Philadelphia, Pa.

HUGH W. ADAMS, 56 Pine St., New York.

For Sale.

Bolt and Nut Machinery.

6 Bolt Cutters, National, capacity up to 1 in.

6 Bolt Cutters, National, capacity up to 1 1/2 in.

6 Bolt Cutters, National, capacity up to 1 1/2 in.

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Trade Report.

BRITISH IRON AND METAL MARKETS.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Sept. 12, 1883.

Scotch Pig.—The market is not so strong, and prices of some brands have declined. We quote makers' brands as follows:

Coltness, alongside, Glasgow.....50/ Langloan, ".....50/ Gartsherrie, ".....50/6 Summerlee, ".....50/ Carnbroe, ".....50/ Glenarnock, " Ardrossan.....50/ Eglinton, ".....40/ Dalmellington, ".....40/ Shotts, " at Leith.....50/6 Lighterage from Ardrossan to Glasgow is 1/3 ton.

Cleveland Pig.—There is an improved demand and prices are steadier. We quote as follows, f.o.b. shipping ports:

Middlesboro' No. 1 Foundry.....43/6 " No. 2 ".....41/6 " No. 3 ".....39/ @ 30/6 " No. 4 Forge.....38/

Bessemer Pig.—Is without change to report, the market ruling dull and weak. W. C. Hematites are quoted 49/ @ 50/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

Blooms.—But little business doing.

Manufactured Iron.—There is a little better feeling in the market and prices are a trifle steadier. We quote at works:

Staff. Ord. Marked Bars.....£ s. d. " Medium ".....6 5 0 @ 6 15 0 " Common ".....6 0 0 @ 6 5 0 Hoops, 20 W. G. and over.....7 0 0 @ 7 5 0 " Common Best.....7 0 0 @ 7 5 0 " Medium.....6 5 0 @ 6 15 0 " Common.....6 10 0 @ 6 15 0 Sheets, 20 W. G. and under.....8 15 0 @ 9 5 0 " Ordinary Best.....8 15 0 @ 9 5 0 " Common.....8 0 0 @ 8 5 0 Welsh Bars.....5 5 0 @ 5 7 6

Steel Rails.—The market continues irregular. Ordinary Sections are quoted £4. 15/ @ £5. 10/, f.o.b. shipping ports.

Iron Rails.—Dull and nominal. Welsh, 30 lb. and upward, are quoted, nominally, £4. 15/ @ £5. 10/, f.o.b. shipping ports.

Old Rails.—The market is a little steadier. Old T's are quoted £3. 5/ and D. H.'s, £3. 12/6 @ £3. 15/, c.i.f. New York.

Scrap.—The market is steady and quotations are unchanged. Heavy Wrought is quoted £3. 5/ @ £3. 7/6, c.i.f. New York. Bessemer Scrap Ends are quoted 60/ for run of mill, f.o.b. shipping ports.

Copper.—The market is weaker and quotations are lower. Best Selected is quoted £68. 10/ @ £69, and Chili Bars, £63. 10/ @ £64.

Tin.—Is steadier. Straits Ingot is quoted, for spot, £94. 5/ @ £94. 15/, and futures, £95. 10/ @ £96.

Tin Plates.—The market is unchanged. We quote:

Tin Plates, 10 x 14, 1st qual. Charcoal.....10/6 @ 21/6 " " " ".....18/6 @ 19/ " " " ".....17/6 @ 18/ " " " ".....16/6 @ 16/6

Spelter.—The market is firmer and quotations have been advanced. We quote Ordinary, at shipping ports, £15 @ £15. 5/.

Lead.—Is quiet and unchanged. Common English Pig is quoted £12. 10/ @ £12. 15/.

Freights.—Steam from Glasgow to New York, 5/6 @ 6/6; Liverpool to New York, 4/ @ 5/; Liverpool to Philadelphia, 5/ @ 6/6, and London to New York, 7/6 @ 9/6.

TRADE AND FINANCE.

Office of The Iron Age,

WEDNESDAY EVENING, Sept. 12, 1883.

A review of the business week presents few salient features. There has been an active development of the fall trade among dry goods jobbers, and many merchants, attracted from a distance by sales forced at public auction, have made their presence felt in other departments. There has also been more animation in speculative circles, due in part to rumors industriously circulated respecting damage to corn by early frosts, but so long as 25 per cent. of an enormous crop is already safe beyond contingencies, any possible harm to the residue in a few exposed sections should not cause serious alarm. All the conditions are favorable to a large volume of trade, the purchasing power of the country being augmented by a wonderfully propitious season in the agricultural sections; money is easy to an extent seldom experienced at this season of the year; stocks of merchandise in the interior are generally much reduced, in consequence of the extreme conservatism of buyers for many months past, and it is well known that prices of all manufactured wares are adjusted to a scale barely covering the cost of production. A Chicago paper fairly represents the tone of our commercial exchanges in St. Louis, Cincinnati, St. Paul and other Western points when it says: "An active trade has already begun. The leading lines of business report a considerably increased demand by country dealers, who, in turn, feel called upon to stock up to meet the better patronage which good crops permit the farmer to exercise. Prices may rule lower than now for the surplus which the farmer has to sell. One thing appears to be certain—whether lower prices prevail or not, they are not likely to be so low as to prevent the producer from being a good customer to the merchant, and

that fact opens up the way for a continuance through the autumn season of a present activity in mercantile business." A New Orleans paper, in an elaborate review, says: "Though the aggregate results of the year have been considerably under estimates, nevertheless the receipts of cotton, sugar, rice, breadstuffs and provisions show a large increase over the corresponding time in 1882," and the outlook for the future is highly encouraging. Advances from Chicago are to the effect that freight is moving eastward in large quantities, the railway traffic showing heavy gains on the previous week, and the volume of grain being in excess of deliveries during previous years at a corresponding date. Lake freights between Chicago and Buffalo are advanced.

The Clearing House statements for the last week are more favorable, but not altogether satisfactory. At 28 leading cities the aggregate shows a decline of 4%, compared with a year ago, but, making allowance for reduced values and the subdued tone of speculation, a fair degree of activity is indicated.

Money is in better demand, and low rates for mercantile paper are rather more difficult to be obtained. Sixty-day and four months' paper is quoted at 6 @ 7%, against 6 @ 6 1/2% one week ago. The bank statement reflects the increasing demands for currency upon this center from the West and South, in connection with the movement of the crops. The specie and legal-tender averages decreased \$1,422,600 and \$525,800, respectively. The loans were expanded \$1,709,700. The banks lost \$1,736,525 in surplus reserve, but still hold \$4,487,500 in excess of the 25% legal requirements.

The imports of foreign merchandise at this port continue rather light, the total for the past week being but \$8,457,546, of which \$5,905,864 represents general merchandise, and the remainder (\$2,551,682) dry goods. The imports of sugar are light, and the receipts of coffee very moderate, but there were rather heavy entries of India rubber, tin and unressed hides. Since January 1 the imports aggregate \$321,825,887, compared with \$352,457,599 for the corresponding period of 1882. The Custom House return of the specie movement gives the exports at \$450,590 and the imports at \$225,480, nearly all silver. The export movement of domestic produce from the port during the past week was on a rather limited scale, the total being but \$6,107,157, against \$6,660,618 for the same week last year. The shipments of breadstuffs and cotton are rather light, while the exports of corn are about up to the average. Since January 1 the exports aggregate \$247,199,663, compared with \$232,511,321 for the corresponding period of last year.

Government bonds are firm, closing as follows:

	Bid.	Asked.
U. S. 4 1/2, 1891, registered.....		

inferior quality, and therefore cannot name as low prices as may be asked for unreliable goods. Our facilities for shipment are unexcelled, having sidings from both Philadelphia and Reading, and Delaware, Lackawanna and Western Railroads, and in easy reach of the Hazleton branch of Pennsylvania Railroad. Correspondence solicited.

Yours very truly,
DANVILLE NAIL AND MFG. COMPANY.

The File Manufacturers' Association have been in session in the Astor House to-day, and have advanced the quotation of Files from discount 45 per cent. to discount 40 per cent.

Durrie & McCarty have been appointed agents for the Thrift File Works, who make both hand and machine cut Files. They will carry a full stock and sell at factory prices.

The Lock Manufacturers held a meeting to-day at New Haven, at which existing prices were continued.

Among our Special Notices will be seen the announcement by E. Bissell & Co., wholesale auctioneers, of a large trade sale of Hardware, to take place on the 26th, 27th and 28th inst. Particulars will be given in our next issue.

We have received the following announcement:

St. Louis, Mo., Sept. 11, 1883.

To the Trade: We beg to state that we have constituted Messrs. Graham & Haines as our agents for the selling of the goods made by the Groom Shovel Company. They will be prepared to execute orders at the same prices and terms, either for home or export trade, as given by us at the factory.

Trusting that this will merit continued and increased orders, we are very truly yours,
GROOM SHOVEL COMPANY.

D. K. HOLTON, Secretary and Treasurer.

The Wilson Manufacturing Company have recently increased their power and facilities for manufacturing, and can now fill orders with promptness. They have engaged Charles B. Morris, formerly with Henry B. Newhall, to act as general sales agent from the factory. The following are the changes in their list prices, and their present discounts:

Page in 1881 catalogue. Discount. Per cent.

Box Mills, Iron Hopper.

No. 100 202 303 304 3 4 2

Side Mills, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

10 to 11, Solid Box Vises, change list.

No. 100 202 303 304 3 4 2

11, Vise Boxes and Screws, change list.

No. 100 202 303 304 3 4 2

12, Pull Bench Vises, change list.

No. 100 202 303 304 3 4 2

13, Parallel Bench Vise Nuts.

No. 100 202 303 304 3 4 2

14, Coachmakers' Vises.

No. 100 202 303 304 3 4 2

15, Cooper's Vises.

No. 100 202 303 304 3 4 2

16, Cotton Samplers.

No. 100 202 303 304 3 4 2

17, Coin Seals.

No. 100 202 303 304 3 4 2

18, Tobacco Cutters.

No. 100 202 303 304 3 4 2

19, Gridirons.

No. 100 202 303 304 3 4 2

20, Cleared Braces.

No. 100 202 303 304 3 4 2

21, Drill Stocks and Bows.

No. 100 202 303 304 3 4 2

22, Breast Drills.

No. 100 202 303 304 3 4 2

23, Bench Screws (Wood Handle).

No. 100 202 303 304 3 4 2

24, Bench Screws (Iron Handle).

No. 100 202 303 304 3 4 2

25, Clamp Heads.

No. 100 202 303 304 3 4 2

26, Lathes.

No. 100 202 303 304 3 4 2

27, Lathes.

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49, Lathes.

No. 100 202 303 304 3 4 2

66, Rudder Gudgeons.	45
67, Boom Foot Stops.	25
68, Boat Spikes.	Prices on application
69, Boat Hooks.	20
70, Marine Spikes (Polished).	40
71, Marine Spikes (Japaned).	20
72, Belaying Pins.	15
73, Ship Scrapers.	10
74, Calking Mallets.	20
75, Hawsing Beeties.	20
76, Sounding Leads.	20
77, Fishing Sirels.	20
78, Tackle Blocks (Malacca Iron).	20
79, Tackle Blocks (Gray Iron).	20
80, Tackle Blocks (Swivel Hook).	20
81, Tackle Blocks (Brass).	20
82, Bale Hooks.	15
83, Box Hooks.	15
84, Can Hooks.	20
85, Flour Barrel Hooks.	15
86, Hoghead Hooks.	10
87, Hawser Pipes.	20
88, Galvanized Haps.	20
89, Galvanized Hinges.	20
90, Brass Hinges.	20
91, Door Bolts.	25
92, Rudder Yokes.	25
93, Calking Irons (Steel Point).	20
94, Calking Irons (Cast Steel).	20
95, Steering Straps.	10
96, Mast Hinges.	10
97, Rollers for Chocks.	10
98, Press Screws for Whalermen.	net
99, Whale and Seine Row Locks.	30
100, Cast-Iron Washers.	On application
101, Sash Weights.	30
102, Rattle and Wrist Shackles.	30
103, Cold Chisels, change list.	50
104, Few Door Butts.	35
105, Mast Sheaves.	35
106, Lignumvitae Sheaves.	30
107, Blockmakers' Rivets.	25
108, Block Pins.	25
109, Mast Hoop Forelocks.	25
110, Pump Chambers.	20
111, Clothes-line Pulleys.	20
112, Quarter Blocks.	20
113, Wharf Blocks.	20
114, Iron-strapped Blocks.	20
115, Rope-strapped Blocks.	20
116, Snatch Blocks.	20
117, Cotton Hooks.	20
118, Box Hooks.	20
119, Hay Hooks.	20
120, Burglar and Trap Stoppers, change list.	40
121, Tugger Iron.	10
122, Lathes.	20
123, Mowing Machines and extras.	net

100 to 107, Mowing Machines and extras.

108 to 109, Mowing Machines and extras.

110 to 111, Mowing Machines and extras.

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308 to 309, Mowing Machines and extras.

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Sept. 12, 1883.

Hardware.	
Aspinwall & Sons, Packages, 4	
Alexandre F. & Sons, Ice machines, cs., 5	
Arctic Ice Mfg. Co., Blades, case, 1	
Machinery, cs., 3	
Baldwin Bros. & Co., Guns, cs., 10	
Baker Hermann & Co., Hdw., cutlery and guns, pkgs., 232	
Downing, Sheldon & Co., Gun barrels, cs., 4	
Drexel, Morgan & Co., Arms, cs., 10	
Duval H. D., Widening rings, 5	
Mach. y. cs., 4	
Field Alfred & Co., Mds., cs., 8	
Package, 28	
Anvils, 21	
Funch, Edge & Co., Axes, cs., 9	
Folsom H. & D. P., Arms, cs., 8	
Mds., cs., 8	
Frederichs Hugo, Chains, cs., 14	
Gerda Otto, Bundles, 150	
Graef Cutlery Co., Cases, 4	
Godfrey C. J., Tubes, cs., 2	
Mds., cs., 11	
Ireland Alfred, Blacked cotton ties, bdls., 3500	
Presses, cs., 3	
Jerome & Co., Clocks, cs., 14	
Johnson John & Co., Mach. y. pkgs., 16	
Knouth, Nached & Kuhne, Mach. y. lots, 4	
Merch. Disp. Co., Arms, cs., 20	
Chains, cs., 14	
Mach. y. cs., 3	
Morris's Sons J. P., Arms, cs., 27	
Moore's Sons J. P., Guns, cs., 22	
Pioneer Iron Works, Mach. y. cases, 7	
Plm. Forwood & Co., Iron doors, 2	
Iron window, 1	
Keys and locks, cs., 1	
Schoverling, Daly & Gates, Arms, cs., 15	
Mds., case, 1	
Thebaud Bros., M. ch. y. case, 1	
The F. F. Witte Hardware Co., Mds., cs., 1	
The Clark Mill End Co., Mds., cs., 9	
Union Hardware Co., Lignumvite, pcs., 170	
Vom Cleff & Co., Ironware, cs., 7	
Wiebusch, Hilger & Co., Chains, cs., 9	
Package, 2	
Witte John G. & Bros., Cases, 3	
Widmayer & Bothof, Plows, case, 1	
Order, Chain, lbs., 4	
Package, 34	
Cases, 13	
Nails, lbs., 40	
Cases, 2	
Anvils, pkgs., 172	
Iron.	
Alexandre F. & Sons, Bundles, 30	
Bais, 172	
Baring Bros. & Co., Rivet rods, coils, 1831	
Crocker Bros., Pig, tons, 107	
Mang. pig, cs., 77	
Duval H. R., Oxide, cs., 22	
Elliott, R. S. & Co., Ore, tons, 300	
Ellis Wm. R., Pig, tons, 100	
Jackson R. D. & Co., Tubes, cs., 4	
Ladenberg, Thalmann & Co., Rods, pkgs., 1	
Landberg Gust., Rivet rods, coils, 1831	
Rods, 1750	
Bundles, 24	

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy,	10.10 @	.....
" light,	10.00 @	.....
Copper Bottoms,	10.00 @	.....
Yellow Metal,	10.00 @	.....
Brass, heavy,	10.00 @	.....
" light,	10.00 @	.....
Composition, heavy,	10.00 @	.....
Lead, heavy,	10.00 @	.....
Tea Lead,	10.00 @	.....
Zinc,	10.00 @	.....
Pewter, No. 1,	10.00 @	.....
" No. 2,	10.00 @	.....
Wrought Iron,	10.00 @	.....
Light,	10.00 @	.....
Stove Plate,	10.00 @	.....
Machinery,	10.00 @	.....
Gate Rails,	10.00 @	.....
Stereotype Plates,	10.00 @	.....
Electrotype,	10.00 @	.....
Small Type,	10.00 @	.....

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen,	3.00 @	4 c.
White Cotton, New,	3.00 @	4 c.
" No. 2,	3.00 @	4 c.
White, No. 1,	3.00 @	4 c.
" No. 2,	3.00 @	4 c.
Seconds,	3.00 @	4 c.
Soft Woollens,	3.00 @	4 c.
Mixed Rags,	3.00 @	4 c.
Gunny Bagging,	3.00 @	4 c.
Auto Batts,	3.00 @	4 c.
Kentucky Bagging,	3.00 @	4 c.
Book Stock,	3.00 @	4 c.
Newspapers,	3.00 @	4 c.
Waste Paper and Scraps,	3.00 @	4 c.
Kentucky Bale Rope,	3.00 @	4 c.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., Philadelphia, Sept. 11, 1883.

Pig Iron.—The market has been very quiet during the week, but prices show a fair degree of firmness, considering the paucity of sales. This fact seems to indicate that the current output is steadily going into consumption, so that renewals of contracts can only be a question of time. It is also encouraging to learn that stocks are being gradually worked down, so that in many respects the condition of the trade is fairly satisfactory. Prices, nevertheless, are a little irregular, and while in ordinary transactions sellers quote same as last week, there is more disposition to make concessions to buyers of good-sized lots. Bids for large lots are not made with much freedom, however, so that the market, as a whole, is probably a shade easier than it was a week ago. No. 1 Foundry Irons are quoted from \$22 to \$23, deliv-

ered Philadelphia, and a fair amount of business has been done in lots of a few carloads at a time; anything beyond that can only be placed by making concessions of more or less importance. No. 2 Foundry is dull and somewhat heavy at \$19.50 @ \$21. Mill Irons show more weakness than other descriptions, although at a price buyers are prepared to take lots of from 500 to 2500 tons in a block. Holders are not prepared to accept prices which would involve absolute loss, however, so that actual sales have been comparatively of but little importance. As a rule, \$17.50 at furnace for standard brands may be considered a minimum quotation, a good many being held at \$18, and from that up to \$19 for a few of the choicest makes. Leading consumers intimate that at \$18 @ \$19 ton reduction they would take hold freely, but at present quotations only a hand-to-mouth trade can be done.

Foreign Iron.—There is some inquiry for small lots of Bessemer, with sales of 500-ton lots at \$21.50 for shipment to Philadelphia. Spiegleisen is held at \$30.75 for 20%, with \$30 bid. There is also considerable inquiry for high-grade Spiegel. Sales of 80% Ferro-manganese at about \$84.50.

Blooms.—There has been rather more inquiry, and a fair business has been done, chiefly at about last week's quotations, viz.: Charcoal Blooms, \$57 @ \$58; Run-out Anthracite, \$47.50 @ \$49; Scrap Blooms, \$42 @ \$44; Northern Ore Blooms, \$39.50 @ \$41.50.

Muck Bars.—Demand fair, with sales at prices varying from \$33.50 to \$34 at mill.

Bar Iron.—The demand has been very disappointing, and only a small business has been done. Prices are hard to quote, quantity and quality required, time of delivery and specification of sizes being important factors at a time like the present. Nominally, \$2.20 @ \$2.25 is the rate for best Refined Bars, but offers to sell large lots at a tenth to three-twentieths less are made almost every day, but without leading to business of any account. Buyers generally seem to require a special make of iron, and in that case quoted rates can be had for limited quantities, but there are plenty of sellers of what is called "guaranteed quality," at prices varying from \$2.05 to \$2.15; hence the market may be called dull, weak and irregular. Skelp Iron is held at about \$2.15, but no sales have been reported for some days.

Plate and Tank Iron.—In this department the report is of a more satisfactory character, there being an abundant demand at firm quotations. The mills have an average of probably five or six weeks' work on hand, and as they are hard pushed for deliveries, there is less anxiety for business than in other departments. Consumers are also pretty well employed, while the outlook for additional work is unusually promising, so that manufacturers feel that there is no necessity for shading prices. Quotations remain same as last week, although it is not easy to place orders, unless for deliveries commencing during October. Sales at about the following rates, viz.: Tank Iron, 2.5¢; Boat Plate, 2.35¢ @ 2.4¢; Shell, 3¢ @ 3.25¢; Flange, 4¢ @ 4.25¢; and Fire-Box, 5¢ @ 5.5¢.

Structural Iron.—Business during the past week has been very satisfactory to manufacturers. Several important contracts have been given out for bridge work, and others requiring a very large quantity of material are likely to be on the market during the fall and winter months. Among the contracts recently closed are bridges for Northwestern roads, Michigan Central, West Shore, Canada Pacific, and a considerable quantity for various points in Pennsylvania. The outlook in this department is therefore more than usually encouraging. Prices remain about as follows: Double-Refined Bars, 2.5¢; Bridge Plates, 2.5¢; Angles, 2.4¢ @ 2.4¢; Tees, 2.8¢ @ 3¢; Beams and Channels, 3.5¢.

Sheet Iron.—The demand keeps up very satisfactorily, and a full average amount of business is being done at about former quotations, viz., for small lots:

Common Sheets, No. 28,	4 1/2¢
Common Sheets, Nos. 26 and 27,	4 1/2¢
Common Sheets, Nos. 21 to 25,	4 1/2¢
Best Refined, 1/4" advance on the above,	5 1/2¢
Best Bloom Sheets, Nos. 26 to 28,	6 1/2¢
Best Bloom Sheets, Nos. 22 to 25,	6 1/2¢
Best Bloom Sheets, Nos. 16 to 21,	6 1/2¢
Common Red Plates, 3/16 to 1/8,	2 1/2¢
Best Bloom, Galvanized, discount,	40¢
Second quality, discount,	50¢

Wrought Iron Pipe.—The market continues very weak and irregular, notwithstanding the fact that the demand is quite up to the average. We hear of a variety of quotations, and buyers of large lots or desirable specifications have no difficulty in obtaining considerable concessions from figures given below, say for retail lots, 60¢ off list price on Boiler Tubes, and 75¢ off on Gas and Steam Pipe.

Steel Rails.—There is still a considerable amount of mystery connected with the Bessemer interest. Anything absolutely definite in regard to price or quantity sold seems to be unattainable at present, but that orders for considerable quantities have been taken at prices less than \$37 would doubtless be a perfectly safe assertion. Rumor mentions \$35 @ \$35.50 as the rate accepted for one lot, but those likely to be perfectly well informed consider that at least \$1 ton more was paid. The nominal rate for winter and spring delivery is understood to be \$37, with slight concessions on orders specially desirable as to quantity, time of delivery, terms of settlement, &c.

Old Rails.—Sales of Old T's for Pittsburgh delivery have been made at \$24.25, and lots for Philadelphia are offered at \$23.50. We hear of sales of 1500 tons at the latter figure.

Scrap Iron.—There appears to be somewhat more inquiry, but the market rules quiet. Choice yard lots are reported scarce, and holders are not disposed to urge business at concessions. Sales at \$25 for carload lots; cargoes offered at \$23 @ \$23.50. Car Wheels are held at \$18, at which figure sales have been made.

Nails.—Are unchanged; the demand appears to absorb the output. Indications point to a continued good demand. Prices are steady at \$3, with slight concessions on large lots.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Sept. 11, 1883.

There has been no material change in the general situation since our last report. Some of our manufacturers express themselves satisfied with the present, and are hopeful of the future, while others talk rather discouragingly. The complaint is not so much of a scarcity of business as unremunerative prices, and this is the result of overproduction. However, the Iron trade of the West has been in a worse condition within a few years than it is at present, and there is no doubt it will steadily improve from now until the close of the year, although no material improvement in price may result. There are encouraging and discouraging features, but we think the latter are outweighed by the former.

Pig Iron.—There has been, but little change in the situation during the week under review. Business continues quiet; buyers are still restricting their purchases to supplying immediate wants, and, while prices are weak, they are without quotable change. Standard brands of both mill and foundry are held with considerable tenacity, holders refusing to make any concessions in order to effect sales. An increased demand is looked for within the next week or two, in view of the fact that the consumption is large and some consumers are getting low in stock and will soon be obliged to replenish. Furnace-men say there is, under the most favorable circumstances, but little margin for profit at present prices; also, that the cost of production has been reduced to the lowest possible limit, and is more likely to be increased than diminished. Coke has already advanced, and there is no chance for reduction in labor or anything else employed in the production of raw iron. This being the case, producers say that rather than submit to any reduction they will blow out, and, as consumers have no reason to look for lower prices, it is reasonable to expect an increased demand within the next week or two, although the prospect for an improvement in prices soon is not, as already intimated, very encouraging. We repeat former quotations:

No. 1 Foundry,	\$21.00 @	\$22.00, 4 mos.
No. 2,	19.00 @	20.00, 4 "
Gray Forge Neutral,	17.00 @	18.00, 4 "
All-ore Mill,	10.00 @	20.00, 4 "
Warm-Blast Charcoal,	25.00 @	27.00, 4 "
Cold,	25.00 @	35.00, 4 "
Bessemer Iron,	21.00 @	21.50, 4 "

Muck Bar.—There has been considerable activity of late, some mill owners believing that they can buy cheaper than they can make. We can report sales of 1000 tons at \$33.50, cash.

Manufactured Iron.—Manufacturers generally report an improved demand, although orders are mostly small and prices remain unchanged. The indications are that there will be at least an average business during the remainder of the year, and while there is not much prospect of a boom in prices, it is pretty safe to conclude that they will go no lower, in view of the fact that current rates afford scarcely any margin for profit—that is, for ordinary Merchant Iron. Specialties (and nearly all the mills are making them) pay better than Merchant Iron, and but for these some firms would be forced out of the business. Merchant Bars may be quoted at 1.85¢ @ 1.9¢; No. 24 Sheet, 3.5¢ @ 3.6¢; Plate, 2.5¢ @ 2.6¢, all 60 days, with usual discount of 2¢ off for cash.

Nails.—The Nail trade continues unsatisfactory and disappointing. Orders are not coming forward as expected, and prices are weak and irregular. Jobbers are holding back in expectation of a further decline; hence business is very unsatisfactory and prices are unsettled. We quote carload lots and upward at \$2.75, 60 days, 2¢ off for cash, and \$2.80 @ \$2.85 in smaller lots. The regular monthly meeting of the Western Nail Association takes place to-morrow, in this city, at which some action will be taken in regard to production. Another stoppage will probably be ordered.

Wrought Iron Pipe.—Business continues unsatisfactory, and, as the season is pretty well advanced, the prospect for an improvement is not very encouraging. The mills here are reasonably well employed, but prices continue unremunerative, and herein is the chief cause of complaint. Discounts on Gas and Steam Pipe remain unchanged at 70 and 10 @ 75%; on Boiler Tubes, 57 1/2 @ 60%; Oil-well Casing, 43¢ @ 45¢ per foot, net; do. Tubing, 14¢ @ 15¢.

Steel.—The Merchant Steel trade continues slow and unsatisfactory; orders are light and prices, especially for common grades, are being cut to such an extent that the margin for profit is very small. Standard brands Refined Cast Steel are still quoted at 11¢ @ 12¢; do. Crucible Machinery, 6¢ @ 7¢; Open-hearth and Bessemer, do. 4 1/2¢ @ 5¢.

Old Rails.—We can report a sale of 500 tons of American Tees at \$24, and the same price is bid for more without finding sellers; may be quoted at \$24 @ \$24.50, although, so far as we can learn, there have been no sales above inside quotations.

Steel Rails.—There is considerable inquiry for near-by delivery, and the mills have about all they can do for this month and next. For November and December, we continue to quote at \$38.50 @ \$39 for near-by and \$37 @ \$37.50 for November and December delivery.

Railway Track Supplies.—Business continues fair; prices unchanged. Spikes, 2.6¢, 30 days; Splice Bars, 1.9¢; Track Bolts, 3¢ with square and 2.2¢ @ 3.25¢ with hexagon nuts.

Crop Ends.—American Crop Ends are offered at \$23.50 without finding buyers; foreign cannot be put here to be sold under \$25 @ \$25.50, but there is no demand for them. Consumers all seem to be supplied.

Scrap.—Old Car Wheels are being offered here at \$19.50, gross, without finding takers; Cast Boring, \$13 @ \$14; Wrought Scrap, \$21 @ \$23, net ton, outside figure for Selected; Old Car Axles, \$30 @ \$32; Wrought Turnings, \$16 @ \$18.

Window Glass.—The wage question has not yet been adjusted, and there is no telling when the factories will be started up again. Trade is only fair, and not at all what it should be at this time. Prices remain unchanged. Discounts on Single Strength, 60

and 20%, and on Double, 70 and 5%—that is, for carload lots and upward.

Coke.—There is an increasing demand, and prices are reported steady as quoted a week ago. The consumption always increases at this season of the year, but there are still a good many idle ovens. We continue to quote at \$1 per ton free on cars at ovens, and \$1.10 @ \$1.15 for small foundry orders.

CHICAGO.

Office of The Iron Age, 16 and 38 Clark St., Cor. Lake St., Chicago, Sept. 10, 1883.

Hardware.—An encouraging business is being done in the different branches of the Hardware trade. Within the past week there has been a greater demand for shelf and builders' materials than has existed for several weeks. For heavy Hardware the market is fairly active, with an increasing demand for blacksmiths' goods. There seems to be a general feeling that if nothing unforeseen transpires, the volume of business this fall will be very satisfactory, and at reasonably fair prices. The present condition of business induces the belief that the prices now obtained will be continued through the season, with very little change.

Nails.—The demand for Nails has been a little less active than that of the previous week. The slight decline has had a tendency to make heavy buyers more cautious, who have accordingly ordered in smaller quantities. In the present condition of the market, stocks being light and consumption about equal to the production, the depression is by most dealers regarded as only temporary, and not likely to have any serious effect upon prices. Carload lots command \$2.90, which was virtually the price last week, and from \$3 to \$3.10 for smaller orders.

American Pig Iron.—The movement of Pig Iron is fair, but not what it should be for this season of the year. Dealers assert that the aggregate volume of business will compare favorably with that of other years for the same period, notwithstanding the fact that the market is regarded as quiet. Most of the transactions are on small orders.

Many of the large consumers are buying in quantities to suit present requirements, instead of laying in their usual winter supply. This display of their lack of confidence in present values has its bearing upon the general trade, and keeps prices weak and unsteady. Lake Superior Charcoal, Nos. 1 and 2, has declined 50¢ per ton, and is now held at \$23; No. 3 at \$24, and Nos. 4, 5 and 6 at \$25, a decline of \$1 per ton on the latter since last week. Some other brands have suffered similar reductions and are now quoted as follows: Briar Hill, \$24; Himrod, \$22.50; Crane, No. 1, \$25; No. 2, \$24; Thomas, \$23 @ \$20.50; Duval, No. 1, \$23.50; No. 2, \$22.50; Fulton Coke, No. 1, \$22.50; No. 2, \$22.50; Southern Coke, No. 1, \$22.50; No. 2, \$21.50; Low Moor, No. 1, \$23.25; No. 2, \$22, 4 mos.; Silvery Soft, \$21 @ \$22.50; Ashland, No. 1, \$23; No. 2, \$21.75, 4 mos.; South Pittsburgh, No. 2, \$21.50.

Scotch Pig.—The market for foreign iron is very quiet, and in general tone is in sympathy with the trade in American Pig. Several lots have changed hands during the week. Glangarnock is quoted at \$27, and Summerlee at \$28 for carload lots.

Bar Iron.—There is no material change from last week. The demand is in a small way, but orders come more frequently. Prices continue to be maintained, with no indication of weakness. Refined Iron is quoted from store at \$2.10 @ \$2.20.

Structural Iron.—There are indications of an improvement in the demand for builders' Irons. From inquiries that are circulating, there is a prospect of considerable trade before the close of this month. We continue the quotations of last week: Angle, \$2.90; Beams, \$3.60, and Channels, \$3.80—concessions for desirable lots.

Scrap Iron.—The market continues much in the same position as a week ago. There is perhaps more offering, but the demand from furnacemen is not of a character to warrant the dealer in stimulating trade with higher prices. We quote, as dealers' purchasing prices for No. 1 Wrought Scrap, 7¢ net ton, \$17; No. 1 Cast Scrap, 7¢ ton, \$15; No. 1 Stove Plate Scrap, 7¢ ton, \$10; Machine Shop Wrought Turnings, 7¢ ton, \$9; Cast Iron Boring, \$7; Old Plows and Plow Steel, \$10; Malleable Scrap, \$5.

EVERETT & POST, 156 Lake street, Chicago, report to us as follows, under date of September 8, 1883: **Pig Lead.**—The Lead market is strong and the demand good, many consumers being in the market; on account of small stocks in hand, a better and more hopeful feeling generally prevails. Sales of some 600 tons are reported. Market nominally \$4.10. Connellsville Foundry Coke.—The position remains unchanged, prices are very firm and the demand continues excellent. Prime Connellsville may be quoted \$5.15 @ \$5.20, and Crushed at \$6.05 @ \$6.20, according to delivery.

CHATTANOOGA.

Office of The Iron Age, Market and 24th Sts., Chattanooga, Sept. 10, 1883.

General trade in the South is in very fair condition. Movements are quiet and prices steady. Production keeps pace with consumption. There is no special embarrassment in any line. The growing crops are doing well. Those harvested have turned out better than was expected. There is no lack of courage among business men in this section, and no letting down in preparing new and refitting old plants for business in the fall months. The weather for the week has been hot in the days and cold nights—very cold for the season. Streams are dry. No boating is being done.

Pig Iron.—There is nothing new to report. Business is confined to small orders bought for present consumption. Stocks are small in the hands of brokers and furnace companies. There ought to be no serious jar in readjusting the Southern market, once business resumes a normal movement. We quote No. 1 Foundry, \$19 @ \$20; No. 2 Foundry, \$18 @ \$19; Gray Forge, \$16 @ \$17; White and Mottled, \$14 @ \$15; Car-wheel Metal, \$24 @ \$25.

Ores.—We quote 50% Brown Hematite, 7¢ ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails took a spurt and went up last week from \$3 to \$5 per ton. They are now about \$22.50, and steady. Wrought Scrap, \$18 @ \$22; Cast Scrap, \$11 @ \$14; Old Wheels, nominal, \$22.

Nails.—We quote them steady at \$3 for large bills, 2¢ off for cash; job lots, 10¢ @ 15¢ higher.

Merchant Iron.—Bar is about as at last report. Mills in the South are running full and dispose of their product at \$2 @ \$2.10 for large bills, 60 days, usual discount for cash, and about 10¢ advance for small lots. We quote Bolts, \$3.20 @ \$3.25; Spikes, \$2.70; Splice, \$2.

Coal.—We quote Fancy Lump, \$3; Common, \$2.50; run of mine to manufacturers, \$1.50 at mills.

Coke.—We quote Furnace Coke, \$3 at point of consumption; Foundry, 10¢ @ 12¢ per bushel.

LOUISVILLE.

GEO. H. HULL & Co., Commission Merchants, report as follows, under date of Sept. 8, 1883: The market during the past week has been very quiet, and, in consequence, prices have been reduced somewhat. There are a few buyers in the market, but they will purchase only at their own figures. We quote as below:

FOUNDRY IRONS.	
No. 1 Hanging Rock Charcoal,	\$25.00 @ 25.50
No. 1 Southern Charcoal,	22.50 @ 23.00
No. 1 Hanging Rock Stonecoal and Coke,	20.50 @ 21.00
No. 1 Southern Stonecoal and Coke,	20.50 @ 21.00
No. 2 American Scotch,	19.00 @ 21.00
Open Silver-gray,	18.00 @ 19.00
Close,	17.00 @ 17.50
MILL IRONS.	
No. 1 Charcoal,	19.00 @ 20.00
No. 1 Stonecoal and Coke, Neutral,	17.75 @ 18.25
No. 2,	16.75 @ 17.25
No. 1,	16.50 @ 17.00
No. 2,	16.00 @ 16.50
White and Mottled, Cold-short and Neutral,	14.50 @ 15.50
CAR WHEEL IRONS.	
Hanging Rock, Cold-blast,	30.00 @ 33.00
Warm-blast,	23.00 @ 24.00
Alabama and Georgia, Warm and Cold-blast,	27.00 @ 28.00
Central Kentucky, Cold-blast,	26.50 @ 27.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of September 8, 1883: **Bar Iron** is firm under a good demand. The supply is free, however, and there is no speculation such as threatened scarcity always brings. There is no longer any fear expressed of prices going lower; buyers are content to get previous prices duplicated. The weakness noted at Pittsburgh, and of which so much point was made, is not serious. Some of those who were cheapest have advanced their views \$1 @ \$2 per ton. The supply of iron locally is somewhat short, owing to the long-continued drought, which has practically suspended navigation. **Hoop and Bands.**—Still very dull. **Sheet Iron.**—The heavier gauges are steady. There is an excellent demand for these; lighter numbers are neglected, and excessive supply is apparent. **Nails** are jobbing in large lots. No one is buying heavily for stock, however, as a little shaking down is deemed not improbable before bottom is reached. The ready promises of immediate shipment would go to indicate accumulation at the mills. **Fence Wire** is demoralized. Competition on Barb Wire was never so active. It is said now that the cheapest way to get Plain Wire is to buy the Barbed and strip it. General trade is good, the only drawback

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of Sept. 10, 1883: We have to report considerable improvement in trade circles for the past week, accompanied by a corresponding increase in confidence for the future. Values rule firmer, but notably unchanged, at annexed figures:

Ref. Bar Iron, 1 to 6 x 3/4 to 1.1/2	2 1/2 @ 2.35
" " 1 to 4 1/2 x 1 1/2 to 1.1/2	2 1/2 @ 2.35
" " 1/2 to 2, Round	2 1/2 @ 2.35
and Square	2 1/2 @ 2.35
Hoop Iron, 1 1/2 wide and upward	2 1/2 @ 2.35
Band Iron, from 1 1/2 to 6 in. wide	2 1/2 @ 2.35
Horse-shoe Iron	3 1/2 @ 3.50
Norway Nail Rod	5 1/2 @ 5.50
Black Diamond Cast Steel	11 @ 12
Machinery Steel	4 1/2 @ 5
Spring Steel	4 @ 4 1/2
Common Horse Nails	10 @ 11
Railroad Spikes, 5/8 x 9	2 1/2 @ 2 1/2
Perkins' Horse Shoes, 1/2 keg of 100	8 1/2 @ 3 1/2
" Mule Shoes	5 3/4 @ 3 1/2

ST. LOUIS.

HOFFER & Co., Pig Iron and Iron Ore Merchants, 214 Pine street, report to us as follows, under date of Sept. 8, 1883: Iron continues moving slowly, with perhaps an increased inquiry. We continue quotations:

Missouri	20.00 @ 20.50
Southern	20.00 @ 21.00
Ohio	25.00 @ 26.00
COAL AND COKE IRONS.	
Missouri	20.00 @ 20.50
Southern	18.50 @ 20.00
Ohio	20.00 @ 25.00
MILL IRONS.	
Red Short	18.50 @ 20.00
Neutral	17.00 @ 18.00
CAR WHEEL AND MALLEABLE IRONS.	
Missouri	21.00 @ 22.00
Southern	20.00 @ 21.00
Ohio	23.00 @ 24.00

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From Our Regular Correspondent.)

LONDON, September 12, 1883.

THE WEEK

has been quite uneventful, save that it has given us a continuance of that fine weather which is of such inestimable value just at this juncture. From a business standpoint the period has been almost null and void, the majority of principals, as well as a great many managing men, being at the seaside or on a tour for the recuperation of their weary frames. It is very probable, indeed, that no larger exodus from commercial centers has ever taken place than this season, the unfavorable weather of July having kept back many holiday makers, and thus increased the customary August rush. In Germany and certain other countries the migration begins earlier and lasts longer than with ourselves, August being pre-eminently the holiday month of the Britishers. All our seaside resorts are crowded to excess, and it is difficult to make business appointments in the metropolis or the larger towns. As a matter of course there is no actual stoppage of trade and commerce, but "affairs," as the French term them, are conducted on a temporary and makeshift basis, so as to keep things moving, but nothing beyond. For this reason there is very little new business on hand, and the few orders given out are mostly provisional. By the middle of September matters will have resumed their usual channel, and as the recess should do something in the way of repairing the damages of the past year, we may look forward to the infusion of new life into the now sluggish veins of trade. It does not follow, of necessity, that the "return of the pilgrims" will be followed by any special spurt, for that is not a matter which depends wholly upon individual effort but it is pretty certain that the utmost will be done with the existing resources, and that no stone will be left unturned in order to lift business somewhat out of the routine groove into which it has fallen of late. Already there are rumors as to initiatory movements in the "season" trades in preparation for the winter and late autumn. The new patterns of vases, stoves, lamps, chandeliers, &c., are being sent out, and in some cases orders are being booked, but the movement will not assume dimensions of importance for a few weeks, owing to the reasons already indicated. So far as I have been enabled to learn, there is a preference for very high-class goods, at proportionately high prices, on the one hand, and for very cheap articles on the other hand, and the demand for medium productions being of a limited character. High art and handwork in metals are being more generally resorted to and meet with success in London and among the better classes, while very cheap machine-made imitations sell best in the country and in the smaller centers of population.

The influx of Americans into London continues on an enormous scale, many thousands of your countrymen being here on their way to and from the Continent of Europe. Many are stopping here for some time, while others find London a very convenient center and rallying place. Mr. A. Carnegie has joined a syndicate formed for the purpose of acquiring the control of a number of newspapers in this country. The London (halfpenny) Echo, with a large circulation, has already been secured, as well as sundry other provincial dailies and some weekly journals. It is said that Mr. Carnegie intends to stay with us, and that he will not improbably enter the field of English politics with a view to a seat in Parliament.

THE IRON MARKET

has remained very quiet during the week, with scarcely any change of importance, a state of affairs which is doubtless largely attributable to the fact that we are now in the midst of the holiday season. Speculative operations are conspicuously absent, the current of business being simply regulated by the wants of the time being. The half-

yearly statistics furnished by Mr. Jeans, secretary of the British Iron Trade Association, show that the make of pig iron during the first half-year of 1883 has been 4,138,225 tons, as compared with 4,341,245 tons during the corresponding half-year of 1882 and 4,252,042 tons during the immediately preceding half-year. The stock of pig iron held by makers and in warrant stores in the United Kingdom on June 30, excluding makers' stocks in Scotland (which are unknown), was 1,315,775 tons, as compared with 1,371,769 tons at the same date last year, and 1,368,854 tons on December 31 last. Thus, the total consumption of pig iron during the half-year ending June 30, 1883, was 4,191,304 tons, being at the rate of 8,382,608 tons per annum, against an actual consumption in 1882 of 8,052,055 tons, showing a decrease at the rate of 270,047 tons per annum. As I have pointed out on more than one former occasion, it is much to be regretted that the stocks of pig iron in makers' own yards in Scotland should not have been made known at the end of the half-year. Even if there had been an increase the fact should have been stated, inasmuch as in the absence of exact figures the public, as well as the trade, naturally assume that the augmentation has been heavy and that makers are keeping back the information for fear of its effects upon the market. At Glasgow the movements of the week in respect of warrants have been purely nominal, owing to the lack of speculative buying. Prices have been almost stationary, with variations of a few pence only, and closed at 46 1/4 p. ton. Scotch makers' brands are easier, in some instances, by 6d. @ 9d. p. ton, but selling values, as a whole, have not undergone any appreciable alteration. Shipments of Scotch pig are still good, and are not unlikely to undergo an enlargement to the United States before long. At Middlesboro' the market continues dull, notwithstanding a well-sustained local consumption and respectable shipments. Prices are in a somewhat anomalous condition. No. 3 for prompt deliveries being held at 39 1/2 @ 39 3/4, and is scarce at that, while futures are obtainable at 38 1/2 @ 38 3/4. These are extremely bare figures, and can scarcely yield an adequate margin of profit to the makers; hence, should they not improve, a curtailment of the rate of production may be anticipated.

On the West Coast, hematite ores rule at 9 1/2 @ 10 1/2 p. ton at the mines, and are in over-supply, while the pig iron of the district is also in slow request. For parcels of mixed, Nos. 1, 2 and 3, in usual proportions, the nominal figures are 49 1/2 @ 50 1/2 p. ton, but it is reported that even less money than the lower limit named is being accepted. There is scarcely any call for export, and the home deliveries are on a limited scale, as compared with those of the past two or three years. In the Midlands and elsewhere, crude irons are tolerably steady, and current deliveries are on a fair scale, but there is no animation in the market anywhere, and the make is in most cases beyond consumptive requirements. In respect of heavy manufactured iron there is little alteration to note, the volume of production being still good, but prices for futures are weak and quite nominal. Fencing wire is very dull, although I hear of sales of lots of 150 tons or so for export. An order for 40 miles of wire netting, which is understood to be for one of the Australian Colonies, is said to have been given out within the past few days. It is understood that the order has been secured by a well-known London house, but no particulars as to prices, &c., have come to my knowledge. It is further reported that another order for about 30 miles of wire netting is about to be given out, or has possibly also been placed. Galvanized iron is quiet and irregular, while the tube trade is confessedly disorganized for the time being. In ordinary merchant iron there are no changes worthy of mention, all prices being nominally maintained on the basis of £7. 10/ for Staffordshire marked bars. Common and medium bars, sheets, hoops, plates, strips, &c., are not very strong, however, and large buyers have no difficulty in enforcing their own views. Ordinary Welsh bars are called £5. 5/ @ £5. 7/6, f.o.b. at usual ports. Iron rails, old rails and heavy wrought scrap iron are without special features to note, and are in indifferent request. Freighters are still low and nominal at late rates. For pig iron, by ordinary steamers, Glasgow to New York, 6/ @ 6/6 is quoted, and by outside boats 5/6 @ 6/6 is accepted. Steel is quiet, with no great amount of new business coming in. The Sheffield crucible steel firms are only moderately well engaged, save two or three concerns with old-established connections, and a few with special productions. The Bessemer and Siemens concerns are all pretty fully employed. Steel rails remain as last week, with nothing particularly new to report. Ordinary weights and sections are nominally quoted at £4. 10/ @ £5 p. ton, but it is believed that these rates do not adequately represent the actual selling values of the day. In tin plates values are sensibly weaker than they were a month ago. In fact, business is being done in a good many quarters at lower rates than those obtained a week ago, and second-hand parcels are freely offering at lower than makers' quotations. The American demand is unusually quiet, even for the time of year. I quote coke tins 15/9 @ 16/6, f.o.b. Liverpool. The renewed agitation on your side for heavier duties on imported tin plates is being watched with some curiosity, but it is generally believed that Congress would hesitate to place higher imposts upon what are virtually the raw materials of so many of your hardware, &c., industries—to say nothing of the canning trades of Maryland, Oregon, &c.

THE ENGLISH HARVEST

is now in full progress, and is being favored with delightful weather, so that there is every probability of the crops being gathered in excellent condition. All over the southern and eastern counties of England the bulk of the oats and barley has been reaped, and most of the wheat will be secured within the present week. For nearly a fortnight past we have had plenty of sunshine and more or less intense heat, which have not only ripened off the cereals in capital style, but have allowed field operations to be conducted day and night. Many of the farmers have

worked by moonlight, and some have not desisted from their labors on the Sunday. In the North of England, as well as in Scotland, the weather has been much less favorable, and the crops are more backward. It is pretty generally believed that the outcome of the harvest will be much better than was feared a few weeks ago. Samples of wheat which have been threshed yield well, and in most cases the weight per bushel is satisfactory, both as regards wheat and oats. Among the various forecasts which have appeared as to the probable results of the present harvest is the following from the Chamber of Agriculture Journal, which is of interest at this juncture:

No. of returns.	Wheat.	Barley.	Oats.
Above average	56	182	176
Average	119	201	167
Below average	302	94	128

Total..... 477 477 471

Or, to state the numbers thus collectively gathered from the whole of Great Britain in such form as to show the percentage of returns in each group, we have:

Returns.	Wheat.	Barley.	Oats.
Above average	11.7	38.2	37.3
Average	25.0	42.1	35.5
Below average	63.3	19.7	27.2

Total..... 100.0 100.0 100.0

In view, however, of the varying sense in which an average crop is interpreted, according to the customary produce of each locality, we have further worked out what, on the basis of our reports, the produce of each county, and of the leading divisions of a county as a whole, would amount to this year. In bushels per acre for the entire area of Great Britain, it thus appears likely we may expect something like the following produce, as compared, first, with the average yield allotted to each crop on a twenty years' survey, on the occasion of Major Craigie's extensive inquiry last winter; and, secondly, as compared with the tabulated results of the harvest of 1882:

	Wheat.	Barley.	Oats.
Standard yield	28.0	34.6	40.0
Crop of 1882	26.6	32.9	43.2
Estimate for 1883	26.2	35.0	40.2

Or, yet again placing these figures, as may be very conveniently done for comparative purposes, in another shape, and assuming the ascertained normal yield to be 100 in each case, the relative position of the three cereals this year and last year would appear to be:

	Wheat.	Barley.	Oats.
1882	93.6	95.1	108.0
1883	93.6	101.2	100.5

THE BRITISH IRON TRADE STATISTICS

alluded to above, *in extenso*, as below. I give them, lest you should not have received them from any other source:

MAKE OF PIG IRON FOR THE FIRST HALF OF 1883, COMPARED WITH THAT OF 1882.

	First half of 1882.	Second half of 1882.	First half of 1883.
Cleveland	1,318,543	1,316,107	1,373,837
Scotland	536,600	569,400	570,000
West Cumberland	472,038	520,143	411,647
South Wales	476,516	466,769	466,301
Lancashire	392,668	360,671	345,916
Derbyshire and Notts	238,513	217,622	194,219
South Staffordshire	190,442	208,001	189,000
North Staffordshire	157,386	159,731	146,023
West and South Yorkshire	151,006	148,157	144,500
Lincolnshire	108,861	98,702	98,702
Northamptonshire	90,471	101,640	111,641
Shropshire	39,275	41,300	37,319
North Wales	25,672	23,041	21,730
Gloucestershire, Wiltshire, &c.	25,000	23,000	18,500
Total	4,241,245	4,252,055	4,138,225

The following are the stocks of pig iron held by makers and in warrant stores in the United Kingdom at June 30, 1883, compared with those of June 30 and December 31, 1882:

	June 30, 1882.	December 31, 1882.	June 30, 1883.
Cleveland	338,571	266,179	275,094
Scotland	610,537	627,900	584,402
West Cumberland	56,453	101,156	56,941
South Wales	57,821	78,510	73,253
Lancashire	90,671	5,200	66,486
Derbyshire and Notts	46,573	38,802	67,500
South Staffordshire	48,511	47,523	55,487
North Staffordshire	30,681	37,737	29,290
West and South Yorkshire	30,635	54,180	45,000
Lincolnshire	15,466	18,720	24,000
Northamptonshire	18,823	60,218	19,500
Shropshire	18,030	21,500	21,000
North Wales	2,437	3,740	2,901
Gloucestershire, &c.	5,320	4,200	1,400
Totals	1,371,769	1,368,854	1,315,775

* Stocks in warrant stores only, makers' stocks on June 30 being unknown.

	Tons.
The stock of pig iron on December 31, 1882, was.....	1,368,854
The production of pig iron during the first half of 1883 was.....	4,138,225
Total.....	5,507,079
Deduct stock at June 30, 1883.....	1,315,775
Total consumption of pig iron to June 30, 1883.....	4,191,304
Being at the rate, per annum, of.....	8,382,608
Against an actual consumption in 1882 of.....	8,052,055

Showing a decrease at the rate of, per annum..... 270,047

SCOTCH PIG IRON

has been wholly and absolutely free from other than the most unexciting features during the week, owing to the absence of many of the leading speculators on their vacations and the utter absence of public interest in this once favorite gambling medium. Warrants have not moved more than 2d. or 3d. p. ton in either direction, while makers' brands are virtually as before, although some of them have been ostensibly reduced to the extent of about 6d. p. ton. Shipments are good, and there is a steady sale for home use, but stocks are heavy, so that, despite the advance in coal, prices seem unlikely to be augmented in the very near future. There are now 115 furnaces at work in Scotland (including 7 on hematites) against 109 a year ago. In Connal's stores the stock amounts to 585,026 tons (an increase of 78 tons on the week) against 630,463 tons this date 1882. Shipments last week were 801 tons

ahead of the comparative week of last year, and to date this year are 410,141 tons, or an increase of 3706 tons. Imports of Middlesboro' pig iron into Scotland reach 167,634 tons, or 24,538 tons above last year to the same date. Writing from Glasgow, on August 25, James Watson & Co. said: "The Scotch iron market remains extremely quiet, both warrants and shipping brands being steady in price. Speculation is dead at the moment, but a fair trade continues to be done in makers' iron. The warrant market here was flat last Monday, the price dropping from 47 1/4 to 46 1/4, cash. On Tuesday it was steady with a small business done between 46 1/4 and 47 p. ton. On Wednesday the market was steady at 47 1/4 @ 47 1/2, while yesterday a limited business was done between 46 1/4 and 47, cash. This forenoon a few transactions took place at 46 1/4, and in the afternoon 46 1/4 was accepted, closing sellers thereat. The shipments last week were 14,884 tons, as compared with 14,083 tons for the corresponding week of last year." We quote:

No. 1.	No. 3.
G. M. B., at Glasgow.....	48/6
Clyde, ".....	48/6
Coltness, ".....	48/6
Langloan, ".....	48/6
Gartsherrie, ".....	48/6
Summerlee, ".....	48/6
Calder, ".....	48/6
Carbarnock, ".....	48/6
Glenasmole, at Ardrossan.....	48/6
Eglington, ".....	48/6
Dalmellington, ".....	48/6
Shotts, at Leith.....	48/6
Kinnell, at Bonness.....	48/6
Carron, at Grangemouth.....	48/6

MIDDLESBORO' PIG IRON

is dull, yet in a somewhat curious and anomalous position. This arises out of the circumstance that No. 3 pig iron for immediate delivery is scarce, and quoted at 39 1/2 @ 39 3/4 p. ton, whereas for deliveries extending over the next few months the same grade of iron can be readily obtained at 38 1/2 @ 38 3/4 p. ton. There does not appear to be anything of the nature of a corner on time, but the situation attracts attention and may offer unexpected developments before long. For G.M.B., f.o.b. at makers' wharves in the Tees, prices are as below for cash, less the usual 2 1/2 % discount:

No. 1.	No. 2.	No. 3.
Foundry.....	41/6	37/6
Mottled.....	37/6	37/6
White.....	37/6	37/6
Refined Metal.....	37/6	37/6
Kentledge.....	37/6	37/6
Cinder.....	37/6	37/6

WEST COAST HEMATITES

are still without noticeable fluctuations and also without any increase in actual business done. That there will be any augmentation of the turnover in this class of pig-iron seems highly improbable so long as the rail industry continues as dull as it is at present. It is also to be noted that stocks are large, and the production outside the consumptive requirements of the market. Mixed numbers are quite nominal at 49 1/2 @ 50 1/2 p. ton, and makers' brands are easy at the following prices:

No. 1.	No. 2.	No. 3.
Cleator.....	51/6	51/6
Workington.....	51/6	51/6
Lowther.....	51/6	51/6
Distington.....	51/6	51/6
Harrington.....	51/6	51/6
Swallowfield.....	51/6	51/6
Maryport.....	51/6	51/6

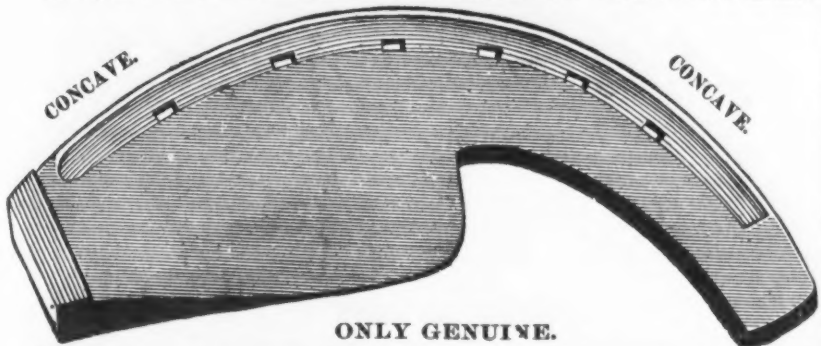
Last week's shipments included 15,863 tons of pig iron, and 2,959 tons of steel rails.

SOME CURRENT PRICES

are as under:

	Prices.
Copper sheets, 4 x 4 p. ton.....	73 00 00
Copper sheathing, 1/2 p. ton.....	75 00 00
Yellow metal sheets, 4 x 4 p. ton.....	00 00 00
Yellow sheathing, 1/2 p. ton.....	00 00 00
Walrus copper, 1/2 p. ton.....	69 00 00
Chili copper, 1/2 p. ton.....	63 13 00
Best selected ingot, 1/2 p. ton.....	70 00 00
Brass wire, 1/2 p. ton.....	00 00 00
Copper wire, 1/2 p. ton.....	00 00 00
Copper tubes, 1/2 p. ton.....	00 00 00
Copper tubes, 1/2 p. ton.....	00 00 00
Sheet zinc, best brands, 1/2 p. ton.....	18 00 00
Hard spelter, 1/2 p. ton.....	10 00 00
Virgin spelter, 1/2 p. ton.....	15 00 00
Virgin spelter, special brands, 1/2 p. ton.....	12 00 00
Renewed spelter, 1/2 p. ton.....	14 00 00
Strait tin, 1/2 p. ton.....	93 15 00
English tin, in ingots, 1/2 p. ton.....	97 00 00
Galvanized sheet iron, 18 & 20 G., 1/2 p. ton.....	12 00 00
Galvanized sheet iron, 22 G., 1/2 p. ton.....	12 00 00
Galvanized sheet iron, 24 G., 1/2 p. ton.....	12 00 00
Galvanized sheet iron, 26 G., 1/2 p. ton.....	12 00 00
Galvanized sheet iron, 28 G., 1/2 p. ton.....	12 00 00
Galvanized sheet iron, 30 G., 1/2 p. ton.....	12 00 00
Gas tubes, black, 2 1/2 x 5/8 off list.....	12 00 00
Gas tubes, galvanized, 2 1/2 x 5/8 off list.....	12 00 00
Boiler tube, 6 x 5/8 off list.....	12 00 00
Quicksilver, 1/2 p. ton.....	12 00 00
Tin plates, 1 C coke, tin lined, 1/2 p. ton.....	10 00 00
Tin plates, 1 C coke, tin lined, 1/2 p. ton.....	10 00 00
Tin plates, 1 C coke, tin lined, 1/2 p. ton.....	10 00 00
German silver sheet, 1/2 p. ton.....	3 00 00
Bright iron wire, No. 6 to 7, 1/2 p. ton.....	9 00 00
Fencing wire, 6 to 7, 1/2 p. ton.....	9 00 00
Wire nails, 10 to 12, 1/2 p. ton.....	00 00 00
Bamboo steel, 1/2 p. ton.....	00 00 00
Regulus of antimony, 1/2 p. ton.....	00 00 00
Crude antimony, 1/2 p. ton.....	00 00 00
Lead, L. B. pigs, 1/2 p. ton.....	13 00 00
Lead sheets, 1/2 p. ton.....	13 00 00
Lead pipe, 1/2 p. ton.....	14 00 00
Lead solder, 1/2 p. ton.....	15 00 00
White lead (genuine dry), 1/2 p. ton.....	19 00 00
Red lead (dry), 1/2 p. ton.....	10 00 00
Tea lead, 1/2 p. ton.....	17 00 00
Steel hoops, 1/2 p. ton.....	9 00 00
Iron—Sweden, 1/2 p. ton.....	0 5 00
Old boiler plates, 1/2 p. ton.....	12 00 00
Old wire rope, 1/2 p. ton.....	3 00 00
Old horse shoes (packed), 1/2 p. ton.....	5 00 00
Belgian bars, No. 1, 1/2 p. ton.....	5 00 00
Belgian bars, No. 2, 1/2 p. ton.....	5 00 00
Belgian bars, No. 3, 1/2 p. ton.....	5 00 00
Belgian bars, No. 4, 1/2 p. ton.....	5 00 00
Belgian bars, No. 5, 1/2 p. ton.....	5 00 00
Belgian bars, No. 6, 1/2 p. ton.....	5 00 00
Belgian bars, No. 7, 1/2 p. ton.....	5 00 00
Belgian bars, No. 8, 1/2 p. ton.....	5 00 00
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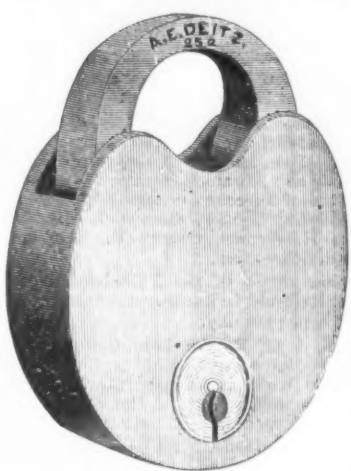
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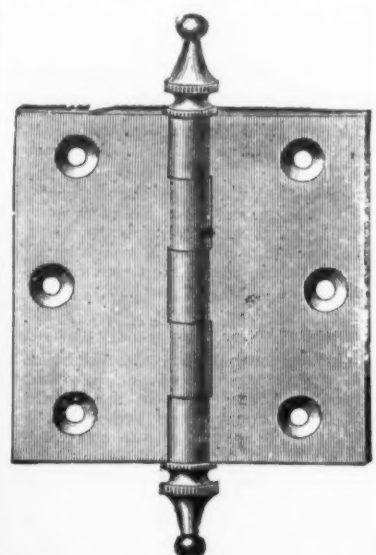
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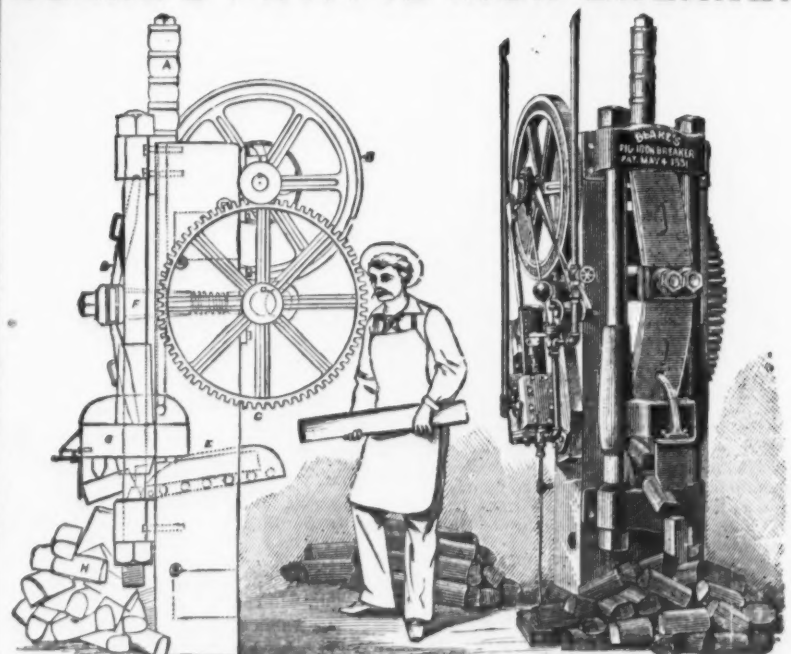
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How Over-Trading Is Fostered.

We take the following sensible article from the *New York Tribune*:

The establishment of another exchange, to be especially devoted to dealings in certain descriptions of produce, is advocated as if it would surely prove a public benefit. But it is doubtful whether these organizations, when they do not restrict transactions to actual transfers of property, are not hurtful to all legitimate trade. They establish rules devised by dealers on purpose to "facilitate trade," and by that they mean to encourage as much trading as they can. Hence, "options" on future months in grain and provisions, and "futures" in cotton, and other devices of a similar nature in other trades, are recognized and supported by rules. A certain time—say, one day—is allowed for payment or delivery on ordinary transactions, and that greatly "facilitates" the operations of those who buy and sell several times the same day. Banks are established for the especial purpose of loaning on property in elevators, or warehouses, or in pipes and tanks. These and many other arrangements of latter-day commercial organization, whether designed to help legitimate business or not, certainly tend to cause over-trading.

As this is denied by many, let us look at the practical working of these devices. Jones has \$10,000, and believes that wheat is a purchase. In the absence of organized exchanges, he could buy outright, say, 8,000 bushels of wheat, have it delivered, pay storage on it, and sell it when he pleased. In no case could he lose himself, or cause anybody else to lose, more than the money he actually has, in such a transaction. But now Jones goes into a factory set up for the purpose of manufacturing prices, and buys a contract to deliver wheat in September. A small deposit having been made by buyer and seller, Jones has four-fifths or nine-tenths of his money left. He sees that the people who are trying to manufacture low prices will succeed for the moment unless more money is brought to the rescue on the purchasing side, and he burns to multiply his expected profits by five or ten, and so he buys more contracts. Presently he finds that he has agreed to take 100,000 bushels of wheat or more, and a sudden fall of one-tenth or less in the price might not only sweep away all his money, but leave him in debt to his antagonist, his broker, or the banker.

Or he buys oil, receives the pipe-line certificates, lends them at once to some other dealer who is "short," and with the money proceeds to buy more oil, and still more, until he has anywhere from 50,000 to 200,000 barrels theoretically belonging to him, on an actual capital of \$10,000. A sudden fall may not only ruin him, but others. He buys stocks—say, 100 shares; uses them as collateral at a bank for \$8000, and with the money buys more, and so on; or takes the simpler mode of buying on a margin through a broker. The practical result is the same in both cases; the amount of property bought far exceeds the real capital of the buyer, and he actually risks not only his own money, but that of a broker, or a bank, or both. In a sudden panic, when there are thousands of such transactions outstanding, it is simply impossible that all who wish to sell should find purchasers. Such panics come, from time to time, in every market, when banks or brokers, or other dealers, are obliged to bear the risks for many speculators who have bought more than they could pay for. But such panics are sure to recur with greater frequency, in proportion as the exchanges make it easy for everybody to risk more money than he possesses. It is very questionable, to say the least, whether such organizations do not hurt legitimate business more than they help it.

Building in New York.—Notwithstanding the large number of strikes in the building trades many new buildings are going up in New York. For the first eight months of the year there were erected buildings at the following cost:

First-class.....	\$12,669,000
Second-class.....	451,000
French and English flats.....	11,986,700
Hotels.....	618,000
Tenements and stores.....	4,830,000
Tenements.....	4,610,000
First-class stores.....	2,816,300
Second-class stores.....	1,019,300
Third-class stores.....	274,935
Offices.....	1,075,000
Factories.....	856,500
Schools and colleges.....	469,000
Churches.....	142,000
Public buildings.....	1,181,000
Stables.....	528,325
Frame buildings.....	217,500
Workshops.....	403,505

Total.....\$44,072,920

New York is every year becoming more and more completely the center of the wealth, of the commerce, of the elegance and luxury of the country. Shut in on all sides by water, it has found a way to shoot up to the sky, and by the next decennial census it will accommodate its 2,000,000 of inhabitants more comfortably than it did its 1,000,000 before the era of flats, elevators and new buildings.

The Multicharge Gun.—Experiments with the Haskell multicharge gun were commenced at Sandy Hook, before the Board of Ordnance officers, on Wednesday, the 5th inst. The moderate charge of 12 pounds of powder was used in the breech the first shot, the result being a pressure too small to be recorded, and the initial velocity of the shot 1067 feet per second. The charge of powder in the breech was increased to 15 pounds, and the shot weighed 109 pounds. The pressure recorded 20,800 pounds per square inch, and the velocity of the shot 1202 feet per second. Another trial under similar conditions gave practically the same results. These trials were made to test the shot, and the latter, upon being dug out of the sand butt, were found to have taken the rifling well and worked perfectly. Experiments were next had for the purpose of testing the gas-check wads and to ascertain the amount of powder required to bring the pressure in the pockets up to 20,000 pounds per square inch. The charge of powder in the first pocket was 15 pounds, and in the breech the same. The shot weighed 110 pounds. The pressure on the breech was 20,400 pounds, but in the pocket less than 18,000 pounds,

too low to be recorded. The velocity of the shot was 1345 feet per second. The next firing was with a charge of 15 pounds in the breech, and the same amount in the first and second pockets. The pressure in the breech recorded 20,100 pounds, and that in the pockets was too low to be recorded. The velocity of the shot was 1506 feet. The gas-check wads worked perfectly, cutting off all windage. Another shot was fired with a breech charge of 15 pounds, and a first-pocket charge of 20 pounds. The pressure in the breech was 20,600 pounds, and that in the pocket 22,250 pounds. The initial velocity of the shot was 1455 feet per second. The trials will continue for a considerable length of time.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

Goodell & Co., of which Hon. D. H. Goodell, member of the Governor's Council, is president and principal owner, manufacture a large variety of table and other cutlery from the cheaper grades, known as "scale tang," up to and including their patent solid and combination handled goods in cocobola, ebony, bone, ivory and white metal; also carving, butcher, skinning, sticking, steak, butter, cheese, bread, putty, shoe, cigar and other knives and forks. This company also make apple parers, potato parers, hammock chairs, seed sowers, &c. They employ about 150 hands, use water-power, have several factories at Bennington, two miles below, and Antrim, the principal office being at the latter place. Mr. Goodell commenced in 1864 with the "Lightning" apple parer, and has added from time to time to his business until it has reached its present status. The company was organized in 1875. Their business, owing to the superior quality of their goods, increased sixfold from 1876 to 1881, and has constantly increased since. The Alford & Berkele Co., 77 Chambers street, New York, sell their goods.

CONNECTICUT.

The Yale and Towne Manufacturing Company are building a steam crane for the Baldwin Locomotive Works, which will be driven by a Westinghouse reversing engine.

The Howe Sewing Machine Company will remain in Bridgeport.

MASSACHUSETTS.

The capital stock of the new foundry at Dighton will be \$20,000.

The brick building at the corner of Swett and Albany streets, Boston, has been fitted up and the casting of steel by the crucible process has been begun by Joseph W. Howard, formerly with the South Boston Iron Company. The steel produced by this process is comparatively soft, is capable of being drawn, tempered and hardened, and is practically sound. All sorts of castings are made, but castings of this steel, on account of their great toughness, are particularly adapted for use in positions where a great strain is encountered. They will take the place of iron castings, and of the expensive iron and steel forgings. Machinists have heretofore not been able to obtain castings of this sort nearer than Pittsburgh, the quickest delivery being about 30 days, while they now can get them in a much shorter time.—*Boston Commercial Bulletin*.

At Clinton, the Clinton Wire Cloth Company are putting in apparatus for galvanizing the wire cloth at their mills. Hitherto this part of the work has been sent elsewhere to be done.

NEW YORK.

At Utica, Chas. Millar & Son have established a lead pipe manufactory, with a capacity of 80 tons per day. The cost of the plant is about \$10,000.

PENNSYLVANIA.

Alderman Jones, of Allentown, has decided against the Bethlehem Iron Company 45 suits for \$13,000, brought by its employees who were engaged in the late strike, and a portion of whose wages was kept back by the company for bills contracted by them at its store. It is said that 300 more suits are to be brought, and their amounts will aggregate between \$80,000 and \$90,000.

The Mont Alto Charcoal Furnace, $\frac{9}{16}$ x 43 feet, resumed work a short time since after an idleness of three months. Fire was lighted in the furnace on Tuesday morning, August 14, and the output during the first 24 hours was $\frac{5}{8}$ tons No. 2 and $\frac{3}{8}$ tons No. 1, a total of 14 tons of pig iron. During the second 24 hours the product was 30 tons No. 1 pig on less than 100 bushels charcoal per ton of 2268 pounds of pig iron. Since this remarkable start the furnace has continued to do excellent work.

F. H. Luttgen, formerly of Jersey City, has removed to Reading, where he proposes to establish a business about October 1st., handling about the same goods as heretofore. Any communications addressed to F. H. Luttgen, Reading, Pa., will reach him.

The Pennsylvania Electric Light Company, of Harrisburg, are now lighting the city and public grounds. They use the Fuller system of lighting, and the power is furnished by a Westinghouse engine of 100 horse-power. At a recent speed test made by the Fuller Company the number of revolutions were found to be almost invariable. The test was made with a continuous recording speed indicator, and the resulting diagram was a straight line.

The Bellefonte Car Works, which are estimated to be worth about \$70,000, are offered for sale at \$26,000.

The Sunbury Nail, Bar and Guide Iron Mfg. Company, have built a rolling mill and nail factory at Sunbury, which will be put in operation in two weeks. The works consist of two double puddling furnaces, one heating furnace, one train of rolls, 15 nail machines ready for work, and 10 more machines on the way. John Haas is president of the company.

It is stated that parties are endeavoring to procure a site in Reading for a large manufactory of agricultural machinery and implements.

Messrs. A. Creveling and George W. Miles, of the Glendower Iron Company, have

recently purchased all the property belonging to the Danville Furnaces, and will, as soon as possible, make such alterations as will be necessary to put the same in active operation.

The Philadelphia and Reading Railroad have commenced preparations in Reading for the erection of a new machine, pattern and carpenter shop, to be 300 x 55 feet.

The Clymer Iron Company has been reorganized under the new letters-patent recently granted. Hon. Hiester Clymer was elected president, and Abraham Sweitzer treasurer. The Board of Directors is now composed of Hon. Hiester Clymer, George E. Clymer, William H. Clymer, George F. Baer and Abraham Schweitzer.

The car shops of the Philadelphia and Reading Railroad, in Reading, are being operated 13 hours per day.

The E. & G. Brooke Iron Company, of Birdsboro, have commenced erecting the foundation walls for a new machine and smith shop in the rear of the car shop at their blast furnaces.

Cornwall Anthracite Furnace, near Lebanon, which has been out of blast for the past six weeks for repairs, is again in operation. Many new improvements have been added.

PITTSBURGH AND VICINITY.

The Westinghouse Machine Company are doing a large business in building small sizes of their engine for running electric lights on the river steamers of the West and South.

The National Tube Works Company will open a branch office in St. Louis about the first of next year.

Sixteen new puddling furnaces are about to be started up in the mill of J. Painter & Sons.

The roof is being placed on the new addition to the Westinghouse Air Brake Works, in Allegheny. It is a very large brick structure, covering an area formerly occupied by 80 dwelling-houses, and making the works cover one block and one-half.

Work on Moorhead & Co.'s new open-hearth steel furnace is being rapidly pushed.

The stockholders of the H. C. Frick Coke Company will meet at Bradford on November 7, and increase the capital stock of the company from \$2,000,000 to 3,000,000. Mr. Ferguson, of the company, says the additional capital will be used for increasing the facilities and enlarging the coke plants of the company.

The firm of Everson, Macrum & Co. has been dissolved. W. H. Everson, J. Q. Everson, C. L. Graff and W. T. Brown have sold their interest in the Charlotte Furnace, but will continue to manufacture bar and sheet iron. D. S. Macrum, Edwin Miles, G. K. Miles and Nathaniel Miles will manufacture pig under the name of the Charlotte Furnace Company.

VIRGINIA.

The Columbia Liberty Iron Company is the name of the new corporation that has purchased the Columbia and Liberty Charcoal furnaces and some valuable mineral lands in Shenandoah County. Mr. Samuel G. Merriek, of Philadelphia, is one of the leading members of the new company.

OHIO.

Reports from Niles state that 20 of the business men of that place have incorporated the Goshen Iron Company, with a view to purchasing the interest of the Ward Iron Company in the New Philadelphia rolling mill. The new company design paying off the liens on the mill as soon as possible, and will avail themselves of the benefits accruing from the town according to the original contract. The capital stock is \$300,000.

The Enterprise Glass Works, of Ravenna, will set pots this week and start up in 10 or 12 days. They have their factory in complete order for work, and the prospects are excellent.

The Ashtabula Tool Works, which have been idle for some time, have started again.

An important iron syndicate has been formed in Cleveland. The Hon. Henry B. Payne, Judge Stevenson Burke, the railroad magnate, William B. Chisholm, President of the Cleveland Rolling Mill Company, and other leading men of that city, being interested in it. The capital will be \$1,500,000, and iron ranges to be opened comprise an area of 60,000 acres, nine miles from Lake Ontario, in Canada. A railroad is to be built, and the output, it is estimated, will be 100,000 tons the first year.

The Trumbull Iron Company, at Gerard, have ordered a steel boiler of 250-horse-power of Reeves Bros., of Niles.

The Joel Hayden Brass Company, of Lorain and Cleveland, are running full, having increased their force last month by 27 men. Though they have all they can do, prices are not satisfactory. An advance is expected, however, this fall.

The Mansfield Bolt and Nut Works are to remove to Toledo.

Notwithstanding that Silas Merchant has made an assignment for the benefit of his creditors, the foundry is running full handed, and the water-works pipes, as contracted for, are being turned out and delivered faster than the pipe can be laid. The special castings are nearly all finished.—*South Cleveland Advocate*.

TENNESSEE.

The Chattanooga Times of August 18 says: For several days past a gentleman who is at present managing one of the largest iron and steel foundries in Ohio has been in this city. He is associated with several wealthy gentlemen who propose to erect a large iron and steel foundry in the South for the manufacture of iron rails, iron architectural designs and general work of that character. He was sent down as an expert to choose the most desirable site, and, after spending several weeks in this region, visiting all the alleged iron centers and carefully weighing their respective resources and advantages, he has chosen Chattanooga. Action will at once be taken.

ILLINOIS.

Ground has been purchased in Waldo Place, between Union and Halsted streets, by the Ellithorpe Air Brake Company, where they are pushing forward the erection of their four-story and basement factory, 50 x

150 feet in size. This factory will be devoted to the production of screw-gear, hand and hydraulic elevators. It is intended to have the buildings completed by December 1, when a force of 50 or 60 men will be employed in them, with capacity for turning out one machine complete per day. The officers of the company are Henry Biedler, president; A. B. Ellithorpe, secretary, and A. C. Ellithorpe, superintendent. Fifteen thousand dollars' worth of additional machinery, including a 75-horse-power Corliss engine and a 100-horse-power boiler, will be put in. The company now have on hand a contract for furnishing a number of screw machines to parties in Milwaukee.—*Chicago Industrial World*.

The Hercules Iron Works, of Chicago, are running to their full capacity. They have shipped within the past 60 days 260 tons of shoes and dies for quartz mills in various parts of the country.

The Chicago Wire and Iron Works have secured the contract for, and are now manufacturing, an iron fence for Madison Park, Chicago. A special feature of this fence will be an elegant drive-way arch surmounted with lamps.

The Norton Iron Works are making a thorough overhauling of their furnace, preparatory to going in blast about October 1.

MISSOURI.

We clip the following from the *Age of Steel*, regarding the industries of St. Louis: The Standard Foundry Company have been running heavier heats in the last two months than ever before in their history. The Moran Bolt and Nut Mfg. Company have their new machinery for making nut locks in operation. The Medart Patent Pulley Company have in the last two months sold more of their goods than ever before in the same period. The St. Louis Bolt and Iron Company are crowded with orders for track supplies.

COLORADO.

It is reported that the Bessemer Steel Works, at Pueblo, are about to change ownership. Quite a number of the workmen are idle and leaving the city.

The United States Consul at Leeds, England, reports that the new United States tariff has proved very disastrous to the woolen trade, the chief industry of that district, causing the orders for woolen goods to fall off greatly. The manufacturers have not yet been able to discover any loophole in the law by which they can evade it. The flax and linen trade of the same district is also very adversely affected by our tariff.

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Superseding all Others.

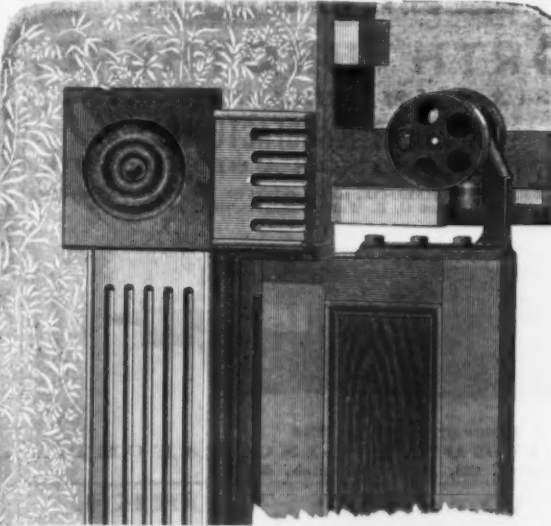
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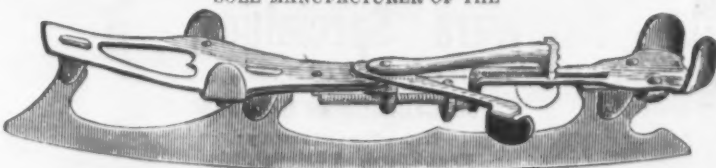
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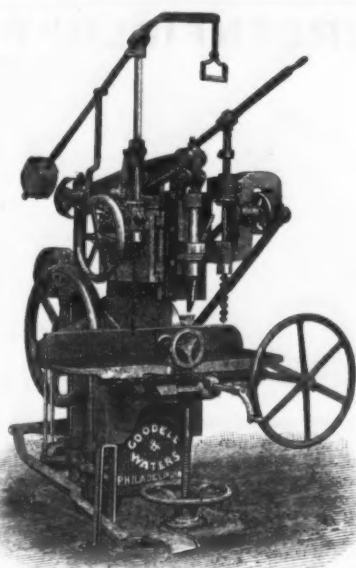
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Wood-Working Machinery

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(For Wholesale Hardware Prices See Pages 31, 32.)

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Foundry No. 2..... \$ 10.25 @ 11.00
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Exterior..... \$ 10.25 @ 11.00
Interior..... \$ 10.25 @ 11.00
Sheet..... \$ 10.25 @ 11.00
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Band..... \$ 10.25 @ 11.00
Pig..... \$ 10.25 @ 11.00
Scrap..... \$ 10.25 @ 11.00
Plate..... \$ 10.25 @ 11.00
Railroad Bars..... \$ 10.25 @ 11.00
Daimlington..... \$ 10.25 @ 11.00

Steel.

Steel at Eastern mills..... \$ 10.25 @ 11.00
All Steel at..... \$ 10.25 @ 11.00

Bar Iron from Store.

Common Iron..... \$ 10.25 @ 11.00
1 to 1 in. round and square..... \$ 10.25 @ 11.00
1 to 1 in. x 1/2 to 1 in..... \$ 10.25 @ 11.00
Refined Iron..... \$ 10.25 @ 11.00
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Electric Locomotive Headlights.

Consul-General Weaver, at Vienna, in a dispatch to the State Department, says that recent experiments with electric locomotive headlights on the Western Railway have been pronounced by the public prints as very successful. He continues:

The conception of illuminating the railroad track by means of an electric light

pose, having a force of 500 carcel jets. The electric machine was placed on the boiler, just behind the smoke-stack, and brought under the immediate control of the engineer, and the road for a kilometer before the locomotive was rendered light as day. The white signals were marvelously brought out upon the black background, and the lamps and lights appeared like yellowish points. The locomotive lamp burned with perfect

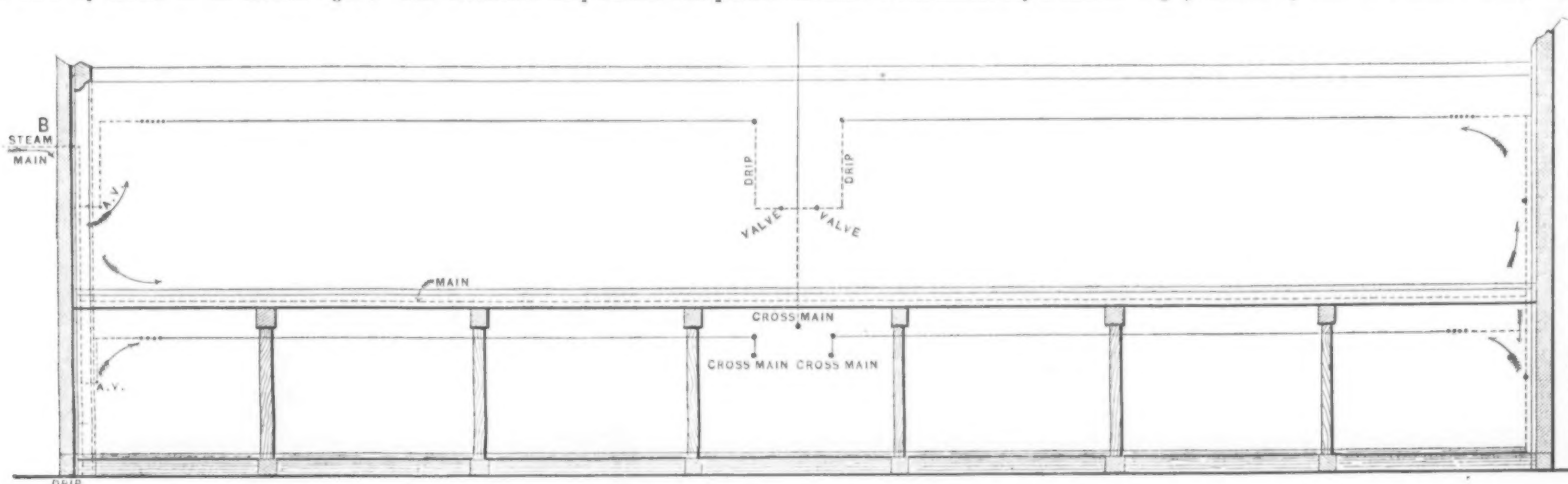
Steam Heating for Machine Shops.

(Concluded from page 3, September 6.)

In the post-office shop, which is on the north side of the works, the case was complicated by certain conditions, and we have a system of piping which admirably illustrates the facility with which a steam-heating system can be modified to suit almost any situation. Fig. 9

the dotted lines that the main line to the east end of the building is carried along in the floor the whole distance. At the end, steam is carried upward to the coils and downward to the coils on the first floor. An end view of this arrangement is shown in Fig. 8. Here, as at the other end of the building, all the valves are easily within reach. How great a convenience this is can only be known by those who have had any experi-

part of the apparatus is found in the boiler or engine room, where all the drips are concentrated, where the feed-water is located, as well as the feed-water heater, separator and steam pipes. The boilers can be fed in three different ways. They may be filled, first, by the pressure in the street mains directly. Referring to the plan, it will be seen that a 4-inch main enters the works through the alleyway at A, is branched to the left, and finally at B enters the boiler-house. In Fig. 8, B indicates the point where it enters the wall. It passes along the foundation behind the separator, and so through the partition wall to the boiler. The next method of feeding is by the injector at



Steam Heating for Machine Shops.—Fig. 7.—Longitudinal Section of Post-Office Shop.

attached to the head of the locomotive has long since ceased to be a novelty in railway engineering, while the advantages to be derived therefrom, if successfully accomplished, have furnished sufficient spur to urge inventors to the greatest possible researches and endeavors. Success, however, has been rendered very difficult from the fact that the oscillation and jars of the engine, while in motion, soon destroyed the delicate apparatus of the best electric lights

uniformity; disturbances caused by the swaying to and fro of the locomotive could not be noticed. When on a curve the lamp turned of its own accord, thereby lighting the track just as effectually as on a straight line.

The new barge office on the Battery at Castle Garden, intended for the landing of foreign passengers, is now nearly finished, but neither the Custom House authorities nor

is a plan, and Figs. 7, 13 and 15 sections. The coils on both floors are arranged as shown in Fig. 9, except that on the lower one the coil A has been removed on account of its proximity to the drying-room, where it caused the ends of the lumber to check by reason of the heat. Steam is brought into the building and carried up through the floors by the riser B, which is on the wall seen in Fig. 11. Steam enters through the pipe B at the upper part of the upper floor, is carried along to

ence with a complicated system of piping placed in the top of the room, and no means of reaching the valve save by long ladders placed against the coils. The system of drips necessary in this building is quite complicated, and in Fig. 10 we give a little diagram showing how they have all been brought together and carried down to a trap at the floor level, from which the water is delivered to the boiler. Fig. 13 shows details of the cross connection of the header, and also the method of putting in drip-pipes. Here a neat little dodge has been found necessary in order to completely drain them. The drips being $\frac{1}{4}$ inch, necessary to drain all the pipes, it was found that the drips could not be taken out at the end of the header, as the

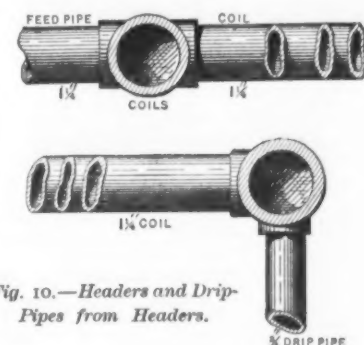


Fig. 10.—Headers and Drip-Pipes from Headers.

A. The injector can feed from the street mains direct to the boilers or through the feed-water heater. This, of course, necessitates a set of cross connections, as shown between the point A and the heater. Referring to Fig. 15, we have a cross-section looking toward the engine-room taken directly through the well in which the hot-water tank is placed. Into this tank come all the drips and the water delivered by the traps from various parts of the building. Into this also come most of the drain-pipes, except that from the separator, where the water is contaminated with oil. This is carried to a draining well outside of the building. The drip of the feed-water heater and of some of the large pipes is carried downward into the well W, which contains the well proper.

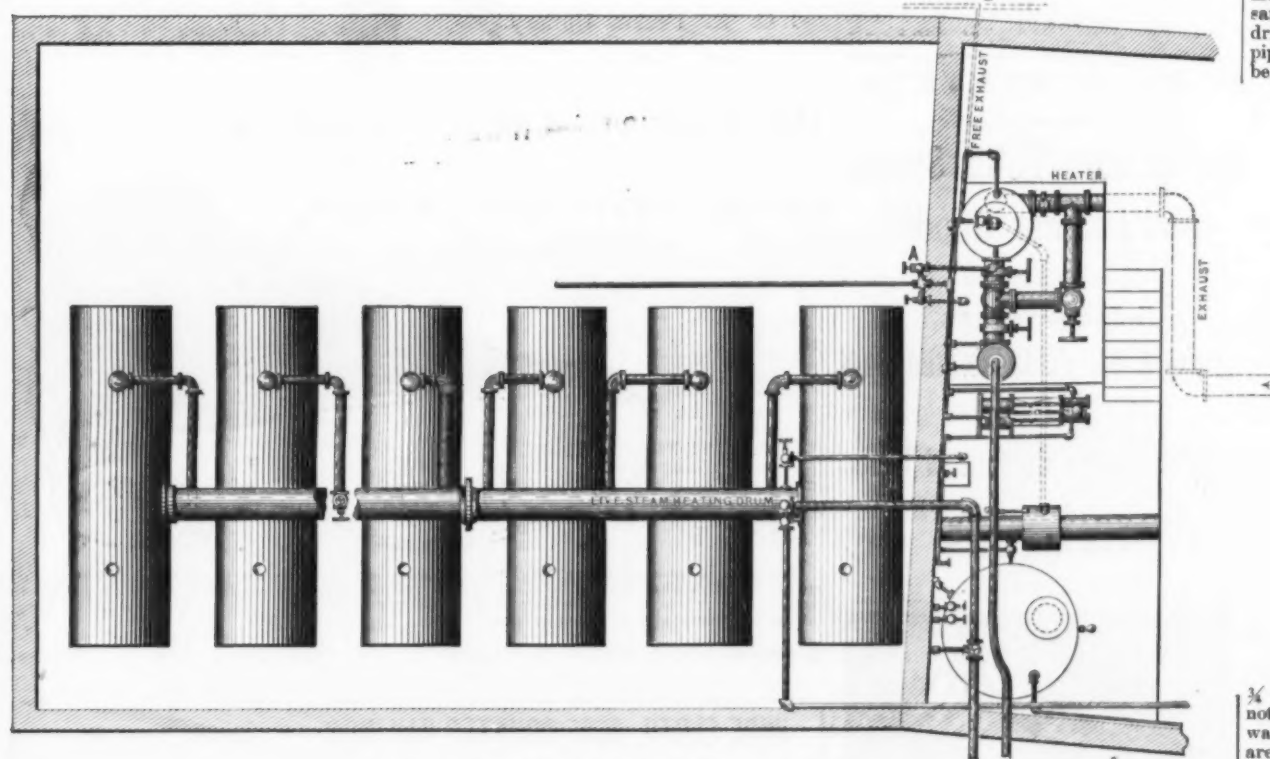


Fig. 8.—Plan of Boilers and Piping in Engine-Room.

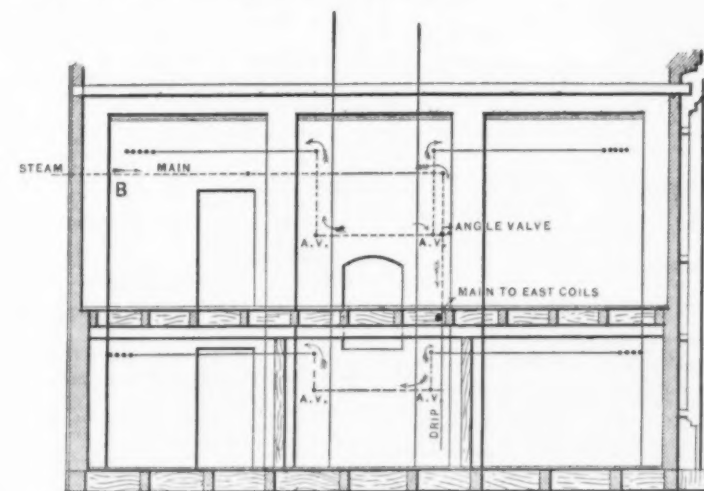


Fig. 11.—The West End of the Post-Office Shop Looking From the East, Showing the Arrangement of the Distributing Pipes.

$\frac{1}{4}$ inch taken out of the $1\frac{1}{2}$ horizontal will not drain to the bottom. Hence the drip was put in beneath. As the steam and water are always moving in the same direction, there is little or no danger of interruption of the circulation.

It is a common practice, even among those who have had a good deal of practical experience as well as theoretical knowledge in putting up steam-heating apparatus, to erect coils, even in exposed positions, where the steam enters at the bottom and circulates upward. We have known of such coils as this, in exposed positions, during the past winter, freezing up even while the steam was turned on. The steam, condensing in

The pump connections are rather complex and not easily traced. The suction has first a connection with the hot well with a suitable stop-valve. Next it has a connection with the cold-water supply. This one passes along the well and is connected with its suction near the hot well. The exhaust from the engine, as shown in Fig. 8, passes toward the heater, and, after going through it, is delivered into a vertical pipe, seen in Fig. 15, through which it either exhausts directly into the atmosphere, or, turning another right angle, passes into the separator. From the separator it rises above the ceiling and passes outward through the pipe marked "exhaust to coils." In the vertical pipe there is a weighted valve which can be arranged to put any amount of pressure that may be desired upon the exhaust heating system. In the summer time this valve is open and the steam, after going through the heater, passes directly into the open air. By means of a stop-valve, shown at C in Fig. 8, the engine can be allowed to exhaust freely into the open air, the heater being cut-off entirely. This is accomplished by large by-pass stop-valves on each side of the heater. The arrangement of this portion of the apparatus is such as to make any possible combination of feed very easy, and to render the apparatus almost independent of a breakdown at any particular point.

By reference to Fig. 12, which is an end view of the battery of six boilers, the reader will see that provision has been made for cutting off each boiler and enabling the plant to run according to the necessities of the case, with any number of boilers that may be necessary. Here, in the arrangement of the connections with the steam drum, the natural method is to put the steam-valve down near the boiler in a position where it would be most convenient. Experience, however, has shown that this is entirely wrong. The location of the valves in such a position is dangerous, and, in more than one instance, has been the cause of accidents by which workmen have been severely scalded. When thus located a little condenser is formed, and, if the boiler is shut off, water collects in sufficient quantities to produce very serious results on starting up. The proper location for the stop-valve is as near the drum as possible. This prevents any portion of the pipe from being filled with condensed water. For this reason we should condemn the sketch which Mr. Briggs inserts in his specifications of the work, or, rather, perhaps we should say that the stop valve ought to be placed nearer the drum than he has shown it. Of course, if each connection were provided with a suitable drip, this danger would be entirely obviated.

In Fig. 14 we have engraved a view of the steam pipes for both exhaust and live steam

(Continued on page 34.)

known, and that a cheap and convenient method of generating the electric current, not immediately dependent on the continuous movement of the locomotive, proved difficult to obtain. In 1881 Mr. Sedlacek, chief of the telegraphic service at Leoben, in Austria, aided by Mr. Schuckert, of Nuremberg, after six years of trial, succeeded in obtaining, it is affirmed, these two great

the steamship companies seem inclined to adopt the place originally proposed. Colonel Kibbe, deputy-inspector, says: "We could handle only one vessel at a time, as the pier is too small to accommodate the passengers and baggage from more than one. At the pier also only one barge could land at a time, the wharf-room being but about 190 feet. If we could be sure that only one steamship

the center bay of the wall, and then carried downward to an angle valve for distribution on the upper floor, and from thence downward to the lower. Between the timbers, a branch—in this same Fig. 11 marked "main to the east coils"—is carried along at right angles to this wall to the further end of the building. Tracing the course of the arrows, the reader will see that steam enters very

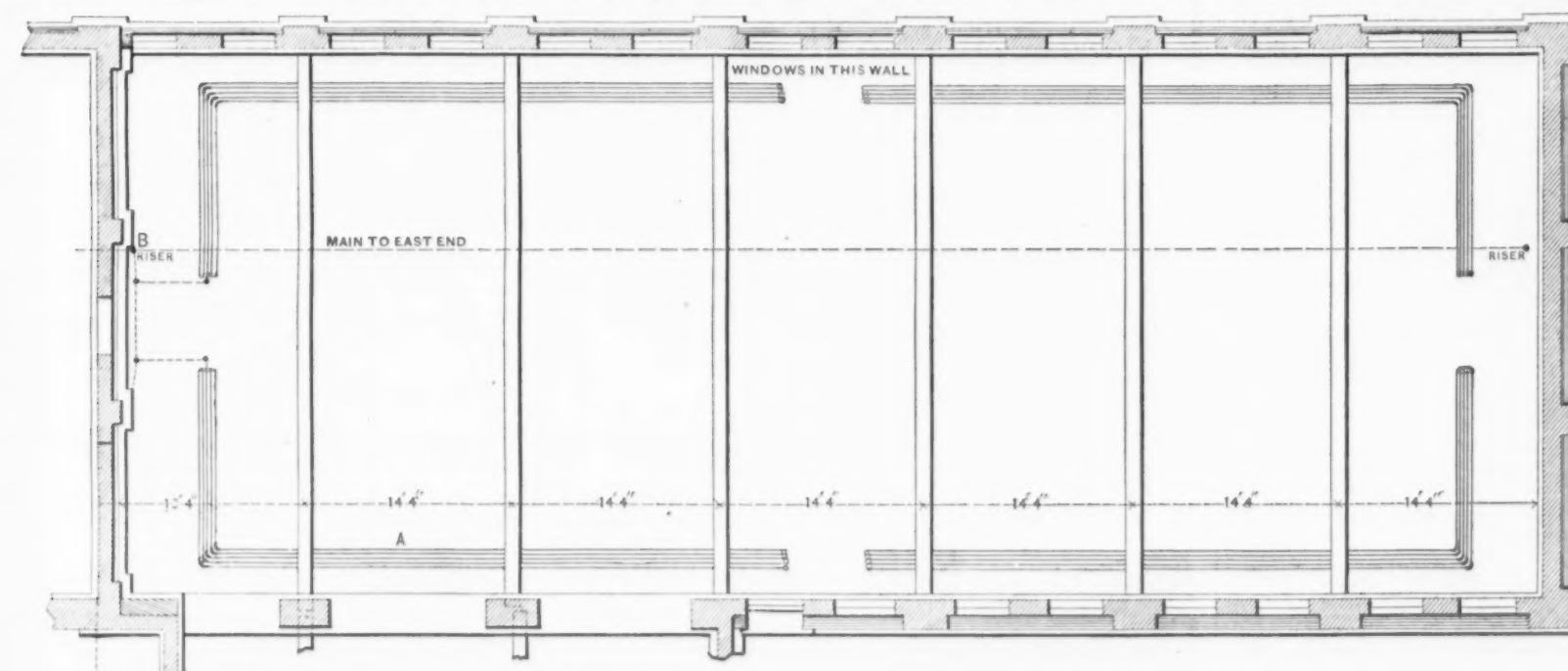


Fig. 9.—Plan of the Post-Office Shop, with Positions of Coils and Steam Mains.

desiderata, first by adopting as generator a gramme machine with a brotherhood motor, furnished with an automatic regulator, having likewise attached thereto a Schuckert dynamo-electric machine. To obtain sufficient current it required from 700 to 800 revolutions of the electric motor, demanding about 3 horse-power, being less than 2 per cent of the force of the locomotive; and, second, the light was procured by a Sedlacek lamp, invented specially for the pur-

would arrive each day this difficulty would, of course, disappear; but not unfrequently four or five come into port close together, and once 12 reached Quarantine in one day. Another difficulty would be the objections raised by passengers themselves, who would in many cases be compelled to wait much longer than at present for the discharge of their baggage. If the scheme is impracticable, the Government Treasury has been depleted some \$300,000 or upward, to no purpose.

nearly at the level of the coils, goes to the middle of the buildings, drops downward, and then is carried upward to the coils. This circuitous route enables all the angle valves by which the coils are fed to be brought down, so that they can be easily reached from the floor level. On the lower floor a similar method of feeding is adopted. The valves are brought down to floor level and the steam rises then to the middle of the coils. Referring to Fig. 7, the reader will see in

the upper part of the coil with great rapidity, filled a considerable portion of it, and the inflow was sufficiently great to hold the water up till it became chilled and finally froze. After this had happened several times, the outlets and inlets were reversed, and no further trouble was experienced—a sufficient proof of the necessity which Mr. Briggs has emphasized in his specifications, of having the flow of steam and water in the same direction. The most complicated

(For Wholesale Metal Prices See Page 29.)

Brass, Corbin's Fast Joint.....	dis 20x10	g	SH
Brass, Loose Joint.....	dis 10x10	g	W

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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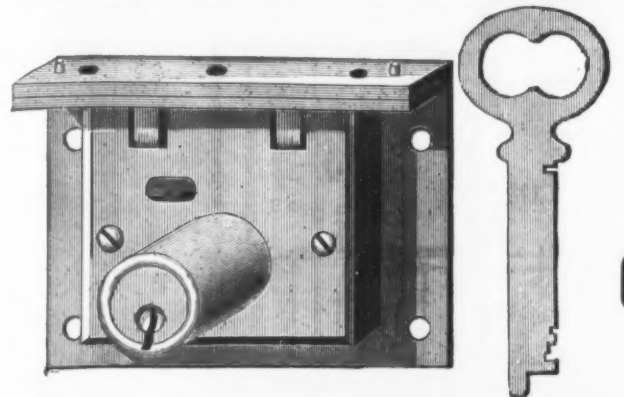
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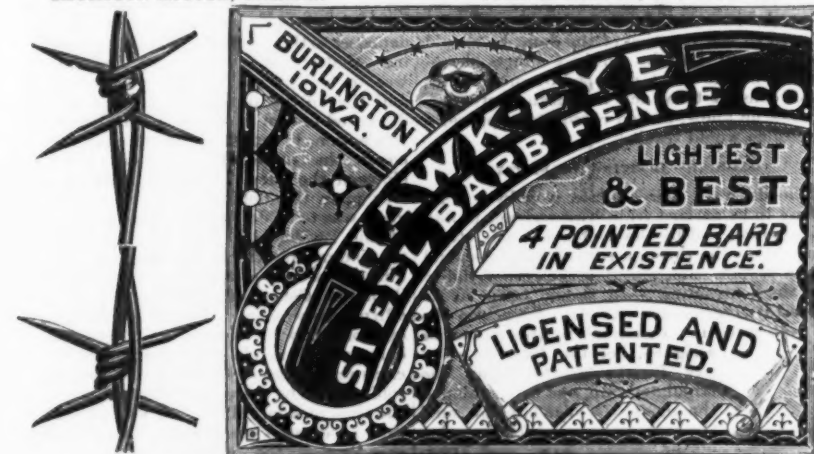
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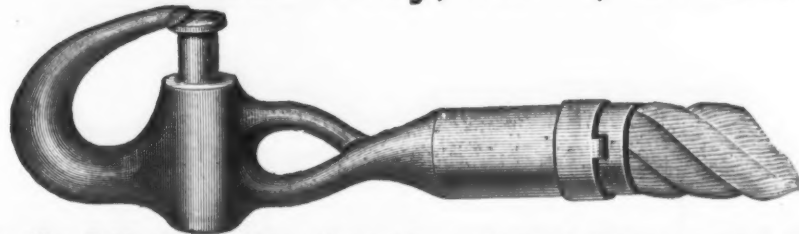
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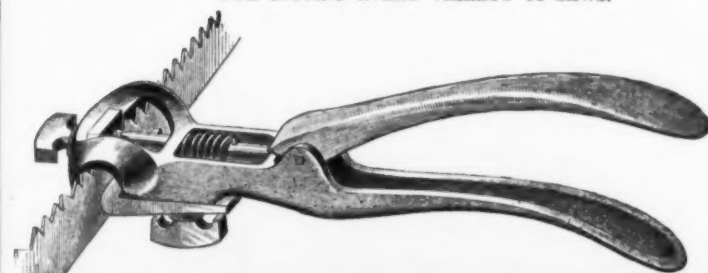
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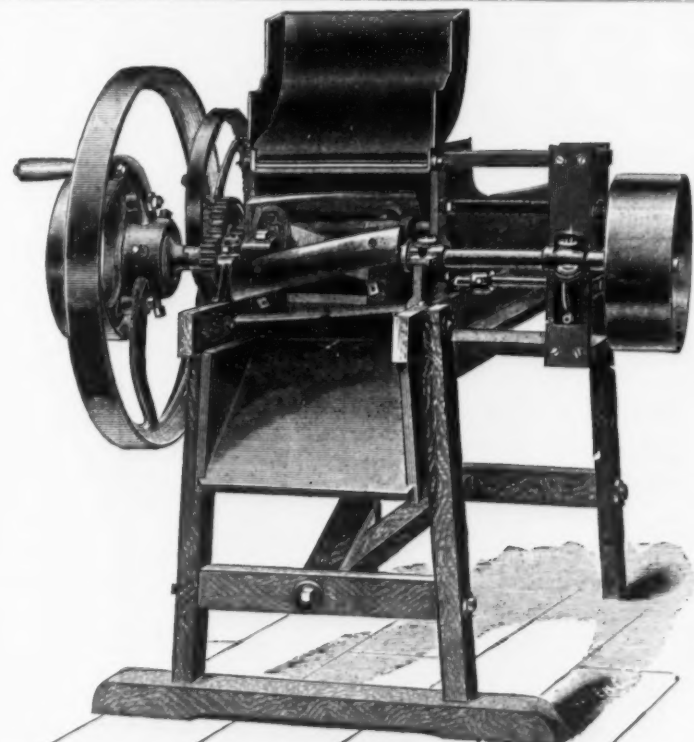
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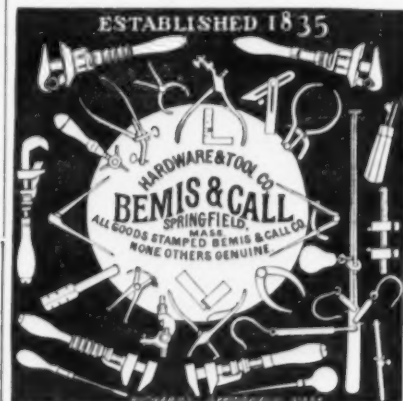
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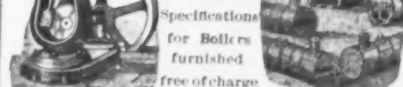
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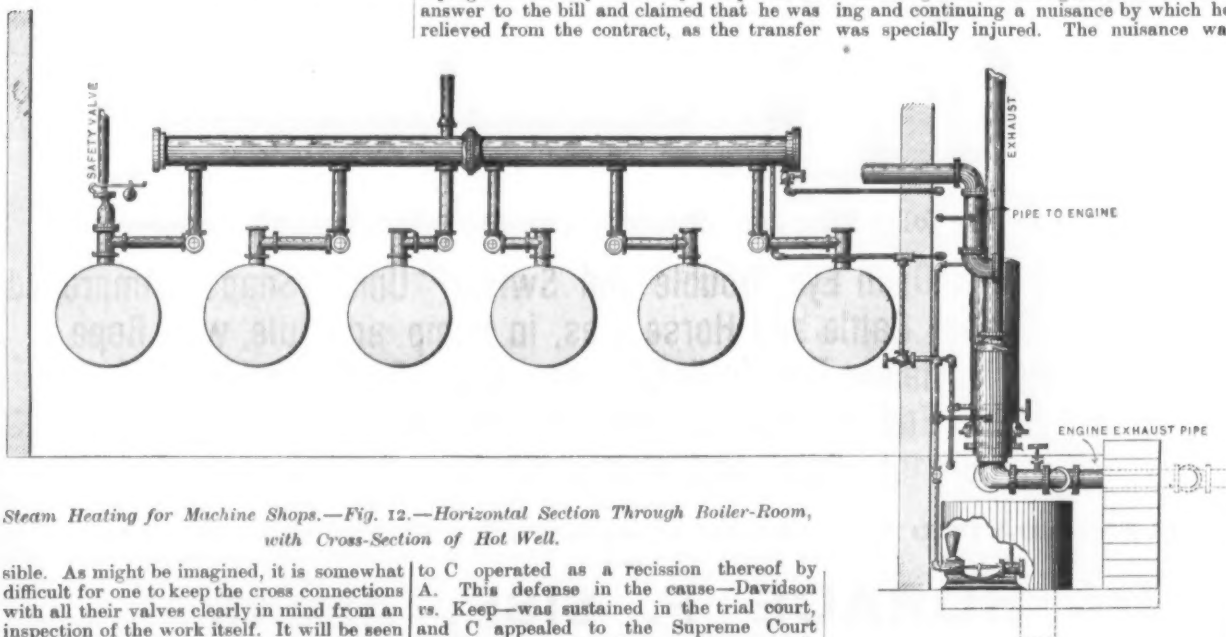
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(Continued from page 30.)

where they first enter the main building. The cross connections from two systems, with all drips and returns, are shown, and the different pipes are labeled in such a way as to make it easy for one to follow the work. The floors have been merely indicated by dotted lines in order to make the steam piping, which is very complex, as simple as pos-



Steam Heating for Machine Shops.—Fig. 12.—Horizontal Section Through Boiler-Room, with Cross-Section of Hot Well.

sible. As might be imagined, it is somewhat difficult for one to keep the cross connections with all their valves clearly in mind from an inspection of the work itself. It will be seen in every case that the cross connection of steam is perfect, and that either live or exhaust steam can be used at will in any given set of coils, independently of any other part of the building.

In conclusion, we perhaps ought to say that the provisions for turning live into the exhaust steam coils is liable to produce a great waste of steam unless worked by very careful men, and as the exhaust steam coils are usually connected, they can, through the hot well, communicate directly with the atmosphere; hence, if steam is turned on too freely the pressure may rise in the exhaust coils so as to produce a continuous blowing-off. The remedy which first suggests itself would be, of course, to put on a reducing valve between the live and exhaust coils, so that on turning live steam into them, the pressure would not be greater than some predetermined quantity.

LATEST LEGAL DECISIONS.

CARRIERS—LOST FREIGHT—SPECIAL CONTRACT.

An action was brought upon a bill of lading for goods which the carrier failed to deliver. The bill of lading stipulated "that in consideration of the rates, it is

CONTRACT—RIGHT TO RESCIND. A sold land to B by a written contract, in which it was stipulated that if B did not make the payments in due order and time A might rescind the contract. These payments were not made as agreed, and A transferred the land and the contract with B to C, who tendered a deed to B, and on his failure to pay the agreed price filed a bill to foreclose the contract, for a sale of the land, and for a judgment for any deficiency. B put in an answer to the bill and claimed that he was relieved from the contract, as the transfer

The intention to rescind must be manifest by some positive act. There can be no question that the defendant could, upon a compliance on his part, have compelled the plaintiff to have specifically performed the contract. If there was no rescission binding on him, none existed, for the rescission of a contract, to be effective, must be mutual, and affect all parties mutually bound."

NUISANCE—SPECIAL INJURY TO ONE PERSON. A brought an action against B for creating and continuing a nuisance by which he was specially injured. The nuisance was

all the public, and private, because at the same time they produce a special and particular injury to private rights, which subjects the wrongdoer to indictment by the public, and to damages at the suit of the persons injured. In such cases an individual may maintain an action, though the nuisance is of a public character, if he alleges and proves

may charge the wrongdoer; and where by the use of such means he may prevent loss, he can only recover for such loss as could not thus be prevented."

SALE—PLACE OF DELIVERY.

Hardware merchants at Minneapolis agreed to sell and deliver to a resident of another town in the State a quantity of

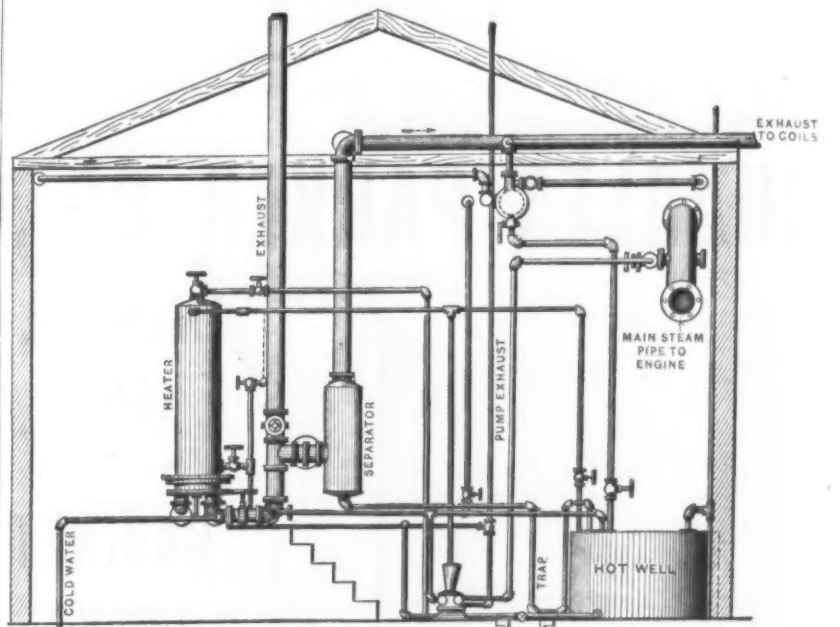


Fig. 15.—Section of Engine-Room, with Elevation of Piping in Hot Well.

a special injury to himself. It is objected here that, as the plaintiff advised and consented to the erection of the dam, he should not recover for the noxious effects therefrom; but he is not estopped by such advice and consent to attack a nuisance created, unless he knew, or had reason to suppose, a nuisance would result."

CARRIER—LIMITING LIABILITY.

Goods were delivered to a railway company to be carried from New Orleans to San Francisco, and by the contract it was stipulated that the through rate of freight should be a certain sum, and that the responsibility of the contracting road should cease at its Western terminus. At San Francisco the goods were not delivered to the owner or assignee, because he refused to pay freight greater than the stipulated rate, and he abandoned the goods. A year later he sued the contracting road for the value of the goods, \$900, and \$1000 special damages. He had not given the defendant any notice of the overcharge, or made any demand upon it for redress in any way, but judgment was rendered for him for the full amount claimed. The defendant took the case—Tardos vs. Chicago, St. Louis and New Orleans Railroad Company—to the Supreme Court of Louisi-

glass. The merchandise was not on hand, but had to be bought in St. Louis. The evidence as to the place of delivery was conflicting—that of the vendors being that the glass was to be put on the cars at Minneapolis, and that of the purchaser that it was to be delivered to him at his town. In the trial of this action, brought by the merchants to recover the price of the goods, the court charged the jury: "The burden of proof was upon the defendant to show that the glass was to be delivered to him at the place of his residence." The defendant carried him in the case—Janney vs. Sleeper—to the Supreme Court of Minnesota, when an affirmation was had. Judge Mitchell, in the opinion, said: "There was no error in the charge. If no place be designated by the contract, the general rule is that the articles sold are to be delivered where they are at the time of sale. This is a rule of contract predicated upon the presumed understanding of the parties when making the contract. This rule is not changed by the fact that the vendor does not have the goods at the place of sale at the time the bargain is made, but must procure for delivery."

Canal Traffic.—Reports from Superintendent Shanahan show at the close of August even a more remarkable increase in

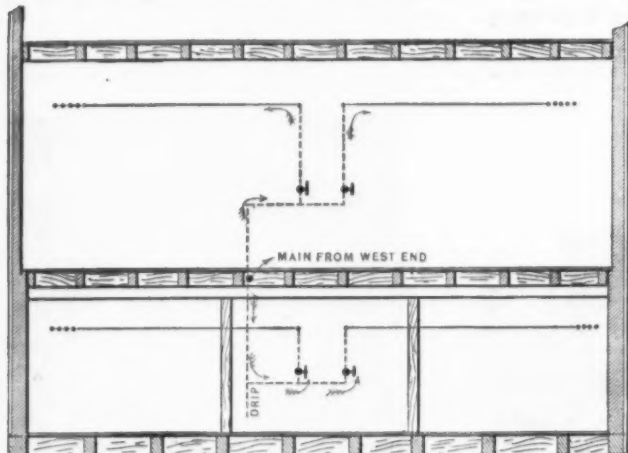


Fig. 13.—East Wall and Cross-Section of Post-Office Shop.

agreed that in case of loss or damage, the same shall be adjusted at a valuation of \$20 per barrel." After a reasonable time for transportation and delivery, a demand was made for the goods, but they were not produced, and no explanation was made to excuse the failure to produce them. The plaintiff recovered the full value of the goods, on the ground that the carrier was negligent, and, therefore, was not protected by the stipulation, and the company carried the case—Alabama Great Southern Railroad Company vs. Little—to the Supreme Court of Alabama, where the judgment was affirmed. The Chief Justice (Brickell), in the opinion, said: "The common law liability of a carrier, which made him absolutely liable for the value of goods entrusted to him for transportation, unless their loss resulted from superior natural force, the public enemy, or the act of the party complaining, can now be limited, by special contract, to exempt from liability as an insurer against fire and theft; but public policy and every consideration of right and justice forbid that he should be allowed to stipulate for exemption from liability for losses and injuries occurring through the want of his own skill or diligence, or that of the servants or agents he may employ, or through his own or their willful default or tort. In this case, there is no pretense that the goods were lost by fire or theft—no explanation whatever is given. Now, the general rule applicable to all bailees of goods chargeable with losses or injuries occurring from negligence is that if, upon demand made, they fail to deliver, and do not account for the failure, negligence will be imputed, and the burden of proving a loss without the want of ordinary care is devolved upon them. When the risks or accidents for which a common carrier is liable are limited by a special contract, the burden of proof rests upon the carrier to show not only that the cause of the loss was within the terms of the limitation, but also that on his own part there was no negligence. Under these rules of law, the carrier is liable in this case."

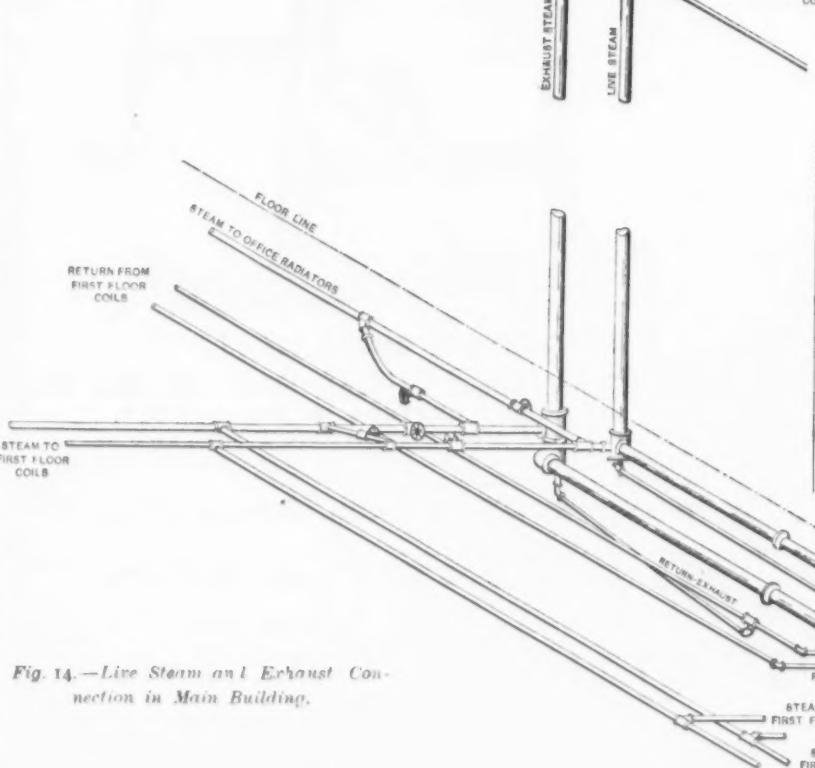


Fig. 14.—Live Steam and Exhaust Connection in Main Building.

made for the purpose of protecting the interest of Keep in the land, so I could make a deed to him on the payment of the money to me." The only thing which indicates an intent to rescind in this conveyance, and this is explained to have been made for the sole purpose of enabling the plaintiff to comply with the contract, and this he did by tendering a deed which is in no manner objected to.

injury to all persons using the water; it was a public and not a private injury, and therefore the plaintiff could not sue. This defense prevailed in the trial court, and the plaintiff appealed to the Court of Appeals of Kentucky, where the judgment was reversed. Judge Lewis, in the opinion, said: "There may be nuisances public, in that they produce injury to many persons, or to

ana, where the judgment was modified, the plaintiff being allowed the exact overcharge of freight, \$58, but required to pay the costs of the appeal. Judge Penner, in the opinion, said: "A carrier may by express and special contract limit his responsibility. In this case the rate of freight was guaranteed, and had the plaintiff paid the overcharges, it would have been the duty of defendant, on notice, to refund them, and had he refused to pay the exaction, and simply notified the defendant of the overcharge, it would have been its duty to pay the amount promptly, or otherwise to effect the delivery of the goods to plaintiff on his payment of the stipulated rate. But the plaintiff did nothing. Equity, as well as law, abhors the idea that a man, who by paying \$58 would escape all injury, may quietly sit down and suffer

damages to the extent of \$1900, and then claim this enormous sum from a third person without even notifying him of the injury, or giving him the opportunity to avert the injury. It is the duty of a party to protect himself from the injurious consequences of the wrongful act of another, if he can do so by ordinary effort and care or at a moderate expense, for which effort and expense he

the tonnage transported on the canals that was reported at the close of July. The increase during the four months of the canal season, as against the same months last year, fifty represents the gains of the free system over the toll system. The following table shows the figures transported (in tons) each week of the two years:

	1882.	1883.
May 14.....	147,104	324,777
May 21.....	105,235	173,227
May 28.....	230,517	201,409
June 4.....	154,409	128,969
June 11.....	180,014	188,444
June 18.....	194,018	199,451
June 25.....	143,515	246,085
July 2.....	147,787	171,112
July 9.....	191,750	162,737
July 16.....	217,359	175,356
July 23.....	181,050	223,425
August 6.....	187,014	234,074
August 13.....	201,275	181,336
August 20.....	234,285	221,796
August 27.....		263,055
Totals.....	2,773,832	3,170,531

This shows an increased tonnage under the free system of 396,799 tons. At this rate the canals will have carried 6,500,000 tons by the 1st of December. Among the staples which show the largest increase is wheat, of which, during a season when railroad managers complain that the crops are not moving in any quantity, the canals carried eastward over 24,000 tons more than they did last year—an amount representing 165,000 barrels of flour. Corn, rye, oats and barley also show an increased tonnage, while anthracite coal, almost as much of a necessity to life as the cereals, has an increased tonnage of 44,264 tons.

Important discoveries of nickel ore are reported in Churchill County, Nev. The specimens are said to have assayed 30 per cent. pure nickel.

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This work is a chronological history of the origin and development of steam navigation from 1543 to 1882. As the author states in his introduction, he has not followed all the inventions and improvements that have intervened. He gives a complete account of the early experimenters, their attempts and what they accomplished; but the main part of the book is devoted to the first practical use of steam as a motive power for vessels at the beginning of the present century, and shows the progressive advancement to the present time. All the important facts relating to marine engineering in all parts of the world are chronicled, and in this particular alone the work is valuable for reference to engineers and others interested. Recent novel inventions and experiments are discussed, and the work includes an appendix of valuable data. The author has gathered a vast amount of matter from original sources which are not generally accessible.

Rankine.—Machinery and Millwork. By Prof. W. J. M. Rankine; 4th edition, revised by W. J. Millar, C. E., with numerous diagrams, 590 pages, 8vo, cloth; 1880 . . . \$5

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This standard treatise, first issued in 1859 from the pen of one who stood at the head of his profession, and whose works on the steam engine are unquestioned authority, has been thoroughly revised, and important information relating to marine practice has been added. As a work of reference, the book is invaluable to the professional engineer.

Rankine.—Manual of Civil Engineering. By Prof. W. J. M. Rankine, 13th edition, thoroughly revised by W. J. Millar, C. E.; with numerous diagrams, pp. 808, 8vo, cloth. London, 1883 . . . \$6.50

This work is divided into three parts. The first treats of surveying, leveling and general field work. The second part relates to the properties of the materials used in engineering works, such as earth, stone, timber and iron, and the art of forming them into structures. The third part treats of roads, railways, systems of water supply, canals, harbors, &c. In the present edition additions have been made to the appendix upon recent practice in civil engineering.

Andre.—Mining Machinery. By G. G. Andre; 182 plates, accurately drawn to scale, 2 vols., 232 pages, 4to, cloth. London, 1879 . . . \$28

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Searles.—Field Engineering. By Wm. H. Searles, C. E., late Professor of Geodesy at the Rensselaer Polytechnic Institute, Troy, N. Y.; 3d edition, 501 pages, full bound pocket-book form; 1882 . . . \$3

This is one of the latest handbooks upon the theory and practice of railway surveying. The author, in preparing the work, had to compete with older books of standard reputation, and has succeeded in making a work of practical value to engineers and scientific schools. It is especially accurate and complete in its details, and contains many short and unique methods of laying out, locating and constructing compound curves, side tracks and railroad lines generally, with a large number of useful tables.

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Roper.—Engineers' Handy Book. By Stephen Roper; 3d edition, 195 illustrations, 690 pages, 12mo, tucks, gilt edges; 1882 . . . \$3.50

This work, the author's latest contribution to the literature of steam engineering, is a compact manual of practical information upon the care and management of all classes of steam engines. It abounds in facts, figures, rules, tables, &c. Recently invented adjuncts to the steam engine are exhaustively treated upon. The book is particularly adapted to engineers of limited education, and to young men who wish to qualify themselves for service in the United States Navy, revenue service or mercantile marine. The various subjects are discussed with clearness and freedom from technicality. A prominent feature of the work is a full explanation of the indicator, its use and advantages.

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This book is one of the most practically valuable that has appeared in a long while. It is especially adapted to steam-fitters, and contains directions for piping buildings and setting boilers properly, with descriptions of the most approved forms of apparatus for warming and ventilating private houses and large buildings, and for cooking purposes. There can be no opportunity for bungling work if the mechanic is familiar with Mr. Baldwin's excellent plans and suggestions.

Box.—A Practical Treatise on Heat as Applied to the Useful Arts. By Thomas Box; 3d edition, revised and enlarged, 296 pages, 8vo, cloth. London, 1880 . . . \$5

Many additions have been made in this edition, especially to the subjects of evaporation, heating liquids and air, and ventilation. The chapters on combustion, steam boilers, chimneys, &c., have been corrected, and a copious index has been added, making this valuable work more reliable and useful for reference.

Tomlinson.—Warming and Ventilation. By Chas. Tomlinson; 8th edition, illustrated, 339 pages, 12mo, cloth. London . . . \$1.20

This book is one of the standard sources from which a great portion of the later facts and diagrams on this subject have been drawn. It treats of the chemical and physical principles involved in warming and ventilation, with details of practical methods for attaining the best results. The chapters on ventilating buildings, ships and mines by mechanical means are especially interesting and valuable.

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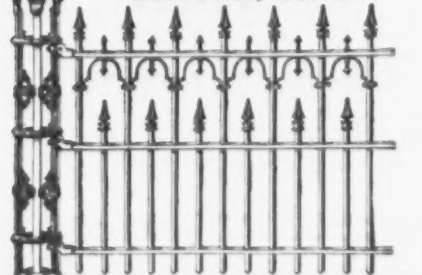
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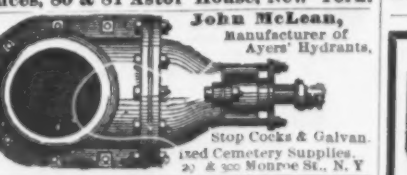
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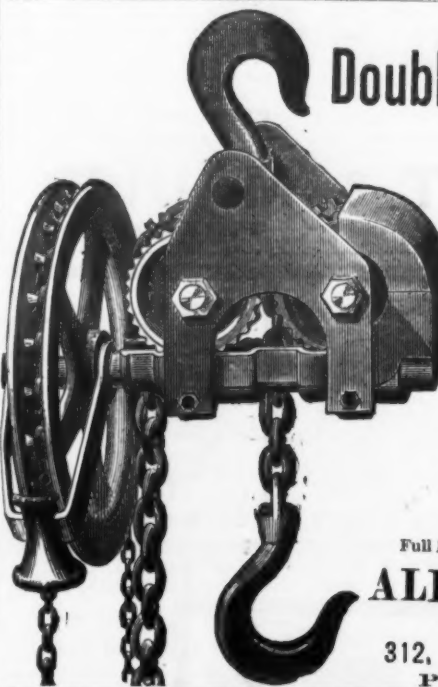
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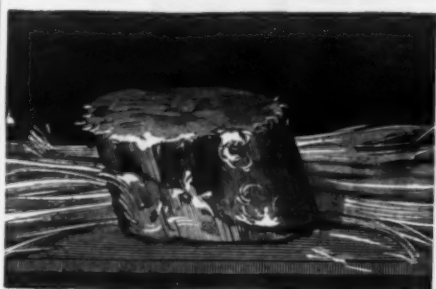
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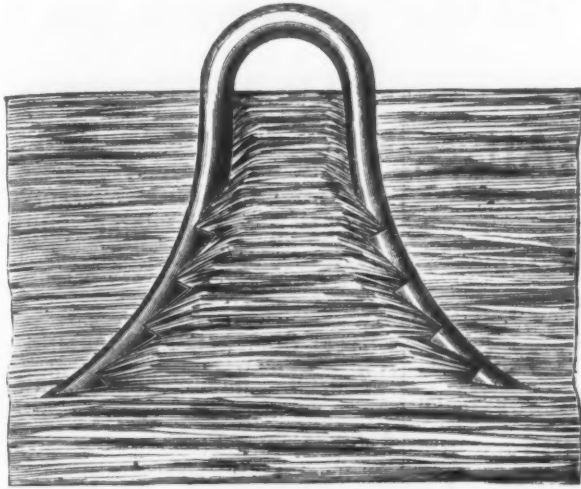
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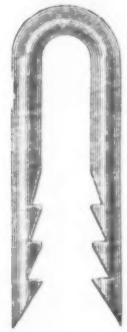
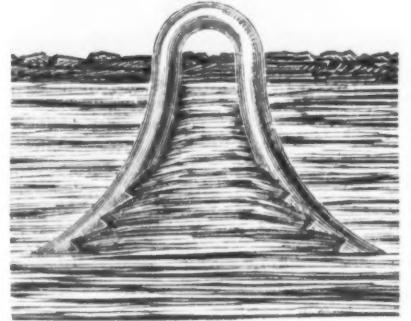
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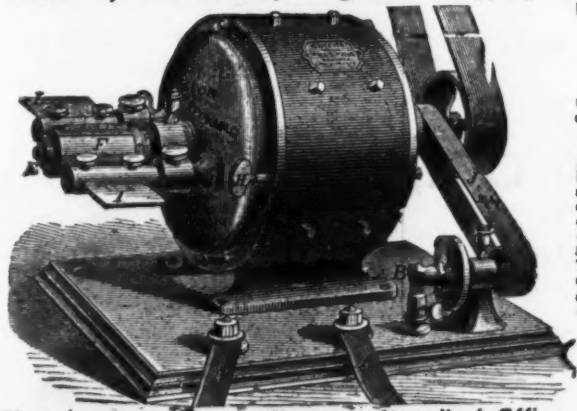
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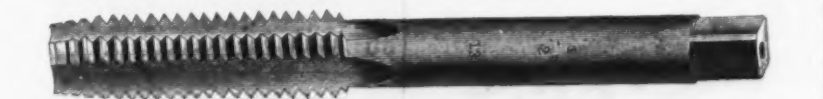


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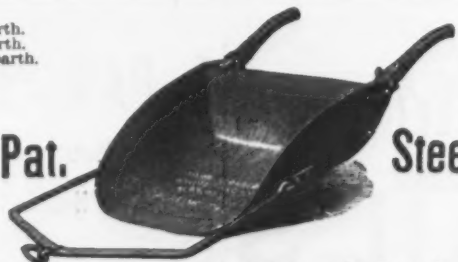
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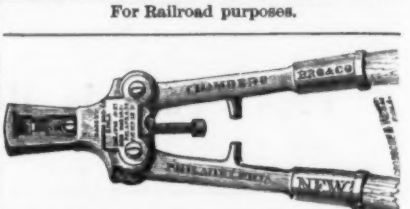
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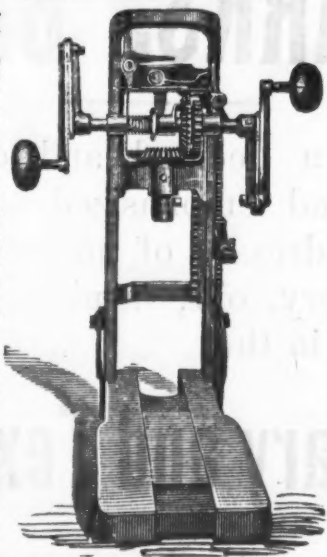
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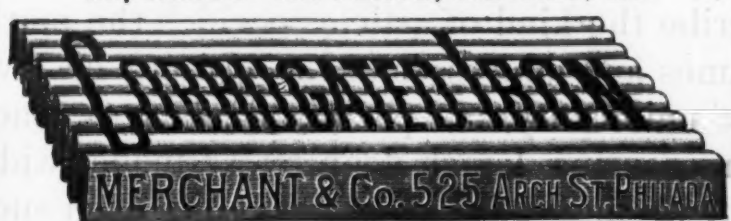


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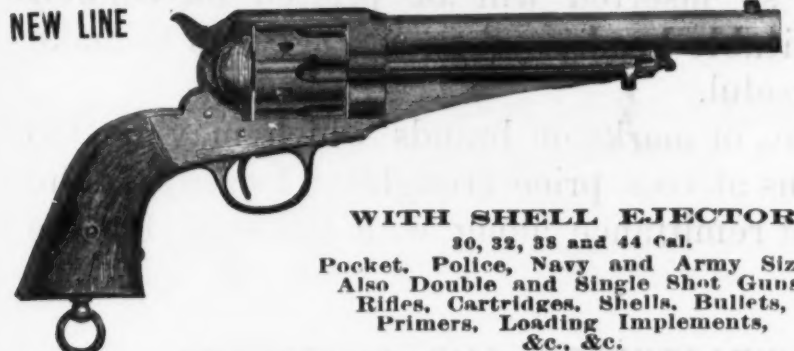
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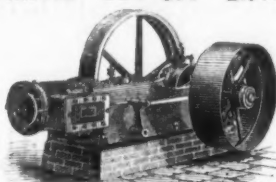
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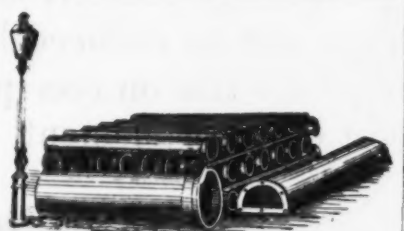
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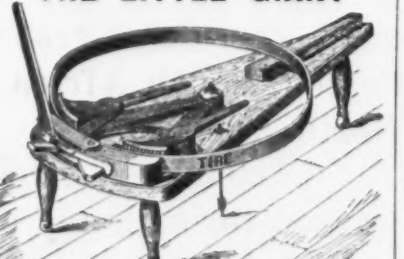


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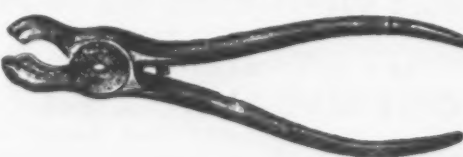
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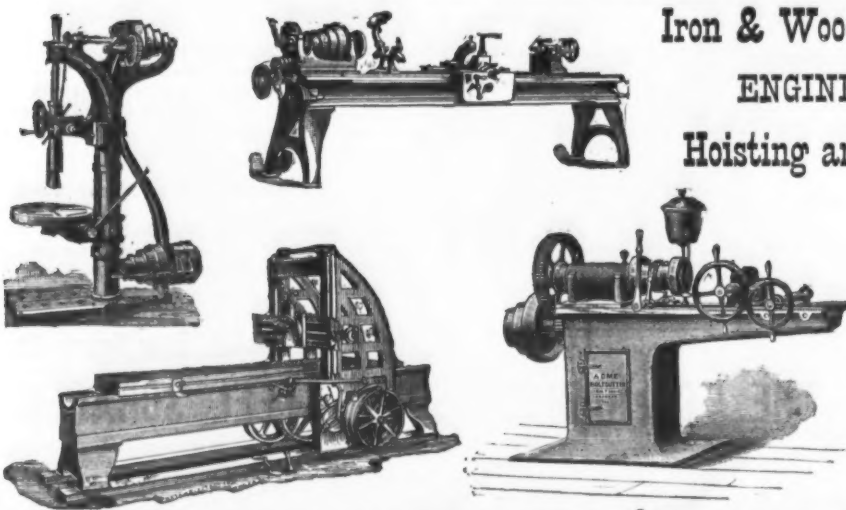
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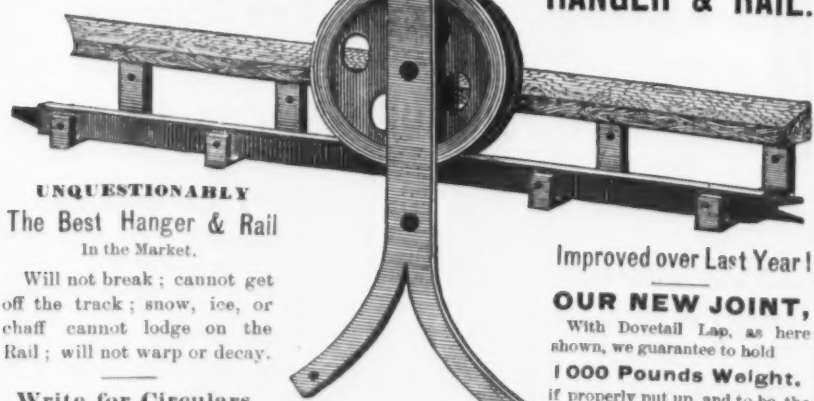
E. B. STOCKING,

Attorney-at-Law,

Opp. Patent Office, WASHINGTON, D. C.

Cutlery.—Pocket American Shear Co's.....	dis 40 5
Butcher Knives Wood's, Lap Bolster.....	dis 20 5
Square Handle.....	dis 20 5
Steak Knives.....	dis 20 5
Lap Bolster, Oval Handle.....	dis 20 5
Sticking.....	dis 20 5
Skinning.....	dis 20 5
Butcher, Common Round Handle, Wood's.....	dis 20 5
Shoe Knives, Wood's.....	dis 20 5
Dividers.—Cook's.....	dis 20 5
Dog Collars.....	dis 20 5
Door Springs.—Torrey's Rod.....	dis 20 5
Imitation Torrey's Rod.....	dis 20 5
Gem Coll, new list.....	dis 20 5
Crown.....	dis 20 5
Warner's.....	dis 20 5
Door Stops.—Thurston's.....	dis 20 5
Drawer Knobs.—Thurston's.....	dis 20 5
Drills.—Morse Pitt Stock.....	dis 20 5
Morse Straight Shank.....	dis 20 5
Emery.—Wellington Mills.....	dis 20 5
Walpole Emery Mills.....	dis 20 5
Turkish in 10 5 cans.....	dis 20 5
Enamelled Ware.....	dis 20 5
Standard Mfg. Co. Kettles.....	dis 20 5
Standard Sauce Pans.....	dis 20 5
Felice Plates.—Wrought.....	dis 20 5
Filles.—American File Co.....	dis 20 5
Nicholson File Co.....	dis 20 5
Fluting Machines.—Knox list.....	dis 20 5
American list.....	dis 20 5
Forks.—W. C. & Co. Manure.....	dis 20 5
Glimet Bits.....	dis 20 5
Genuine German, No. 135, 1-3 to 5-3, per doz.....	dis 20 5
Pierce's.....	dis 20 5
Glass Cutters.—Combination Glass Cutter and Knife Sharpener.....	dis 20 5
Grub Hoes.—K. P. & Co's No. 2, 1-10 to 5-10, per doz.....	dis 20 5
Hammers.—Haydole's.....	dis 20 5
Carlford Hammer Co.....	dis 20 5
Hangers & Rollers.—Anti-Friction.....	dis 20 5
Acme Rollers.....	dis 20 5
Climax.....	dis 20 5
Common Hangers.....	dis 20 5
Common Rollers.....	dis 20 5
Hand Screws.....	dis 20 5
Hatchets.—C. F. Dowse new list.....	dis 20 5
Underhill.....	dis 20 5
Hay Ropes.—Lightning.....	dis 20 5
Fisher's Patent.....	dis 20 5
Hinges.—Strap and T (new list).....	dis 20 5
Providence Hook.....	dis 20 5
Wrought Screw Plate.....	dis 20 5
Hoes.—W. C. & Co's.....	dis 20 5
Hooks and Staples.—Brewer's (new list).....	dis 20 5
Horse Nails.....	dis 20 5
National Finishes.....	dis 20 5
Putnam Pointed.....	dis 20 5
Bridgewater.....	dis 20 5
Ice Cream Freezers.—Packer's, new list.....	dis 20 5
Knobs.—"Norwalk." New list.....	dis 20 5
Silver Glass.....	dis 20 5
Silver Glass Bell Pulls.....	dis 20 5
Lanterns.—Tubular, No. 2.....	dis 20 5
Lawn Mowers.—"The Daisy," 12 in. cut.....	dis 20 5
14 in. cut.....	dis 20 5
16 in. cut.....	dis 20 5
18 in. cut.....	dis 20 5
Lead.—Sheet.....	dis 20 5
Pipe.....	dis 20 5
Locks.—Norwalk.....	dis 20 5
Eagle Cabinet.....	dis 20 5
Eagle Trunk.....	dis 20 5
W. Wilcox & Co., Padlocks.....	dis 20 5
Manure Forks.—W. C. & Co.....	dis 20 5
K. P. & Co., Long Cutter, \$10.00 per doz.....	dis 20 5
K. P. & Co., Short Cutter, \$15.00 per doz.....	dis 20 5
K. P. & Co., Pick Cutter, \$15.00 per doz.....	dis 20 5
Measuring Tapes.—Edley's.....	dis 20 5
Heat Carriers.—Miles' Challenge.....	dis 20 5
Halo's, (new list).....	dis 20 5
American.....	dis 20 5
Money Drawers.—Tuckah's Am.....	dis 20 5
Money Traps.—Delusion.....	dis 20 5
Novelty.....	dis 20 5
Nails.....	dis 20 5
Others.—Zinc and Tin.....	dis 20 5
Brass and Copper.....	dis 20 5
Ox Hoes.—Extra finished and varnished.....	dis 20 5
1 1/2 in. pair.....	dis 20 5
1 3/4 in. pair.....	dis 20 5
1 1/2 in. pair.....	dis 20 5
1 3/4 in. pair.....	dis 20 5
Paper.—Tarred Sheathing.....	dis 20 5
Tarred Eagle Brand.....	dis 20 5
Picks.—A. P. & Co., Adze Eye, 4 to 6 in.....	dis 20 5
E. P. & Co., Adze Eye, 6 to 7 in.....	dis 20 5
Planes.....	dis 20 5
Fancy Planes.....	dis 20 5
Razee Planes.....	dis 20 5
S. Y. Tool Co., Common Toth.....	dis 20 5
English Iron.....	dis 20 5
Bailor's.....	dis 20 5
Plated Ware.—Bogers & Co.....	dis 20 5
Pliers.—Vom Cleft & Co's.....	dis 20 5
Butt's Wire Pliers.....	dis 20 5
Plumb & Levels.—Stanley R. & L. Co.....	dis 20 5
Pocket Knives.—American Shear Co's.....	dis 20 5
Potato Diggers.—W. C. & Co., reduced list.....	dis 20 5
Pulleys.—Acme or Excelsior, 1 1/2 in.....	dis 20 5
Acme or Excelsior, 2 in.....	dis 20 5
Pulley Blocks.....	dis 20 5
Pumps.—Union Manufacturing Co.....	dis 20 5
Iron Clusters.....	dis 20 5
Iron Pitcher Spout.....	dis 20 5
Copper.....	dis 20 5
Rivets.—Black (new list).....	dis 20 5
Carriage in 10 5 papers (new list).....	dis 20 5
All balances on list.....	dis 20 5
Razors.—Torrey's.....	dis 20 5
Razor Straps.—Torrey's.....	dis 20 5
Rules.—Stanley, Boxwood.....	dis 20 5
Stanley, Ivory.....	dis 20 5
Saw Irons.—Common.....	dis 20 5
Laundry.....	dis 20 5
Tailors' Goggles.....	dis 20 5
Enterprise, "Putter".....	dis 20 5
Sash Locks.—King & Hutchinson.....	dis 20 5
Sandpaper.—Baeder & Adamson.....	dis 20 5
M. B. & D.....	dis 20 5
Sash Weights.—Patent Eye.....	dis 20 5
Saws.—Hand Saws, Disston's.....	dis 20 5
Wheeler & Clemson.....	dis 20 5
Cross-Cut Saws.....	dis 20 5
W. M. & Co., Common Toth, No. 1.....	dis 20 5
W. M. & Co., Champion Toth.....	dis 20 5
Disston's Common Toth.....	dis 20 5
Disston's Great American Toth.....	dis 20 5
Boynton's Lightning Toth.....	dis 20 5
M. B. & D., Hand Saws.....	dis 20 5
W. M. & Co.'s Circular Saws.....	dis 20 5
Richardson Bros.....	dis 20 5
Saw Blades.—Disston.....	dis 20 5
W. M. & Co.....	dis 20 5
Welch & Griffith, Extra.....	dis 20 5
Welch & Griffith, No. 2.....	dis 20 5
Scales.—Fairbanks.....	dis 20 5
Screws.....	dis 20 5
American Flat-Head Iron.....	dis 20 5
American Flat-Head Brass.....	dis 20 5
American Round-Head Iron.....	dis 20 5
American Round-Head Brass.....	dis 20 5
Grillier Round-Head Flat Common.....	dis 20 5
Seines.....	dis 20 5
Shovels.—Kimball's.....	dis 20 5
Shovels.—American Shear Co., new list.....	dis 20 5
Shot.—Talham's.....	dis 20 5
Shovels.—O. Ames, new list.....	dis 20 5
O. Ames, other brands, new list.....	dis 20 5
M. B. & D.....	dis 20 5
Sinks.—Morse Patent.....	dis 20 5
Snow Shovels.....	dis 20 5
Skates.—Union.....	dis 20 5
ACME.....	dis 20 5
Imperial Club list No. 5, \$3.75 per pair; list No. 7, \$4.00 per pair.....	dis 20 5
Sticks and Dies.—King's.....	dis 20 5
Tacks.....	dis 20 5
Sweden Tinned.....	dis 20 5
Gimp and Lace.....	dis 20 5
Copper Tacks.....	dis 20 5
All balances on list.....	dis 20 5
Traps.—Onida, Genuine.....	dis 20 5
Onida, Imitation, H. & N.....	dis 20 5
Black's.....	dis 20 5
Vices.—Simpson's Adjustable.....	dis 20 5
Howard Vice Co.....	dis 20 5
Presses.....	dis 20 5
Weather Strips.—Faber's.....	dis 20 5
Brown's Flexible Rubber.....	dis 20 5
In 2 1/2 foot boxes; No. 1, 1/2 in. wide, 1/2 yard; No. 2, 2 1/2 in. wide, 1/2 yard; No. 3, 1/2 in. wide, 1/2 yard; Black Walnut Spring Weather Strips.....	dis 20 5
Window Springs.....	dis 20 5
Babcock's No. 3.....	dis 20 5
Babcock's No. 4.....	dis 20 5
Wire Cloth.....	dis 20 5
Wire Fence.—Scott's Patent, Painted.....	dis 20 5
Scott's Patent, Galvanized.....	dis 20 5
Wire Goods.—Gate Hooks and Eyes, &c.....	dis 20 5
Wrenches.—A. G. Coe's.....	dis 20 5
Girard Mfg. Co.....	dis 20 5
Girard Appl.....	dis 20 5
Wingings.....	dis 20 5
Novelty No. 2 for Common Tubes.....	dis 20 5
Novelty "3".....	dis 20 5
Excelsior E.....	dis 20 5
Excelsior F.....	dis 20 5
Excelsior A with Folding Bench.....	dis 20 5
Novelty Bel Tub.....	dis 20 5
Novelty Bel Tub.....	dis 20 5
Keystone, Wood Frame No 14.....	dis 20 5
Keystone, Iron Frame No 24.....	dis 20 5
Zinc.....	dis 20 5

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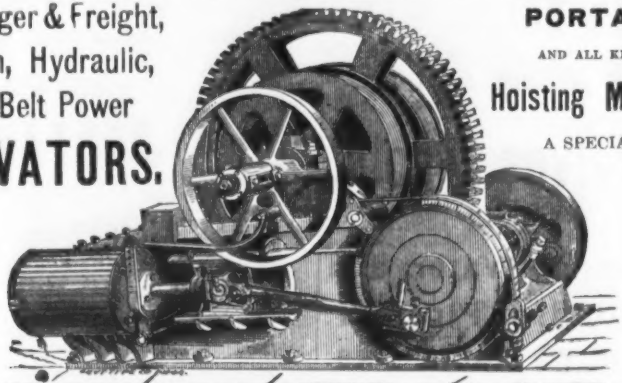
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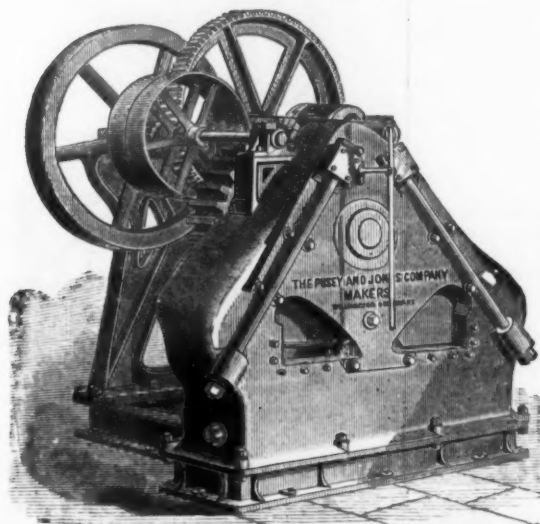
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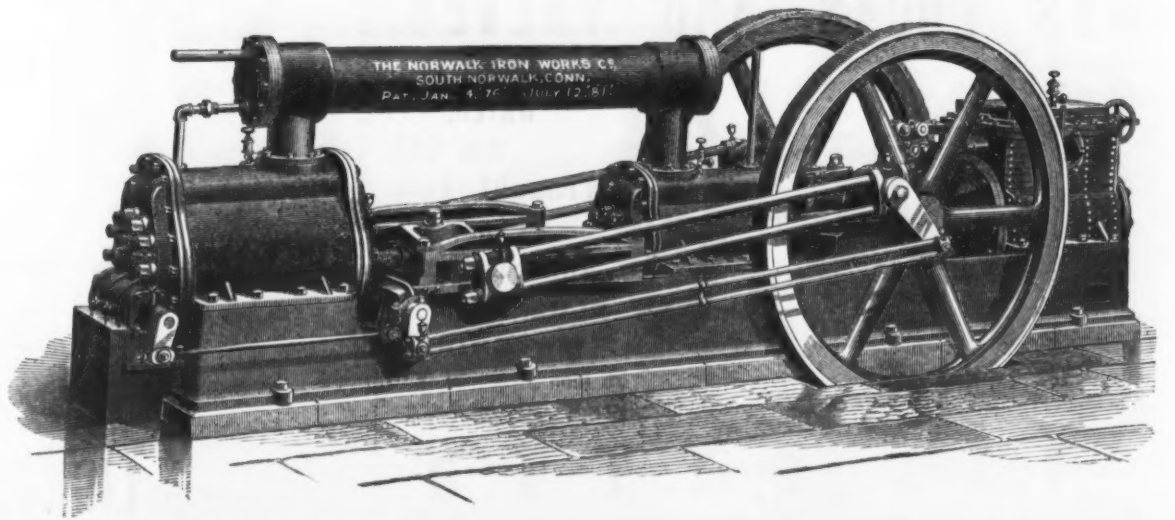
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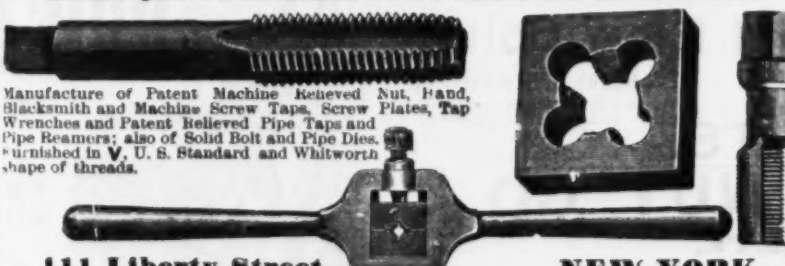


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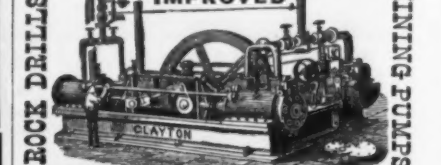
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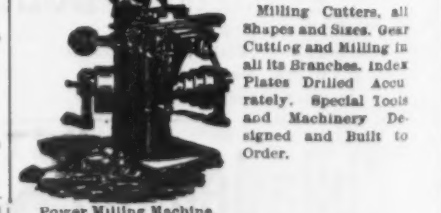
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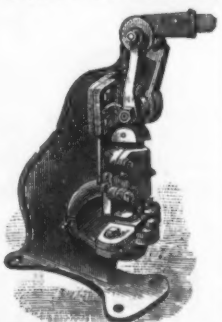
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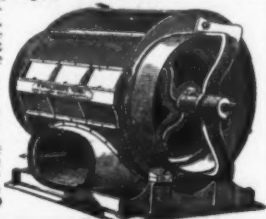


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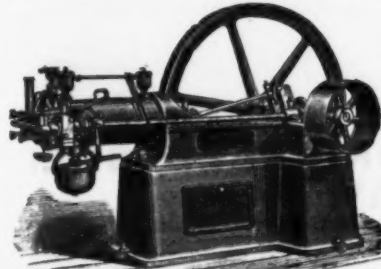
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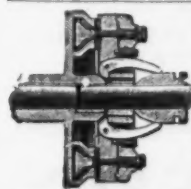
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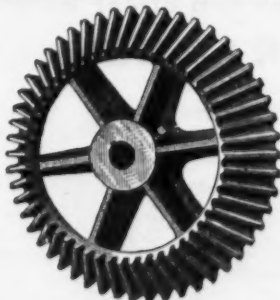


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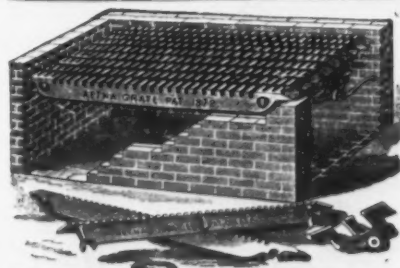
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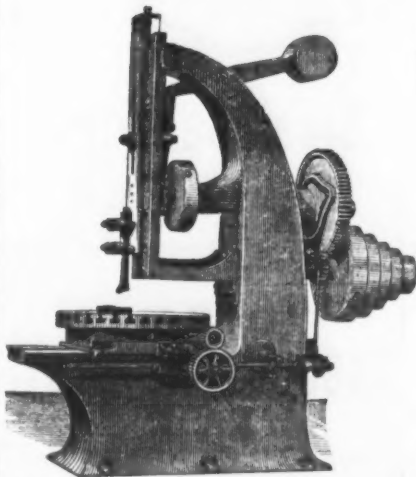
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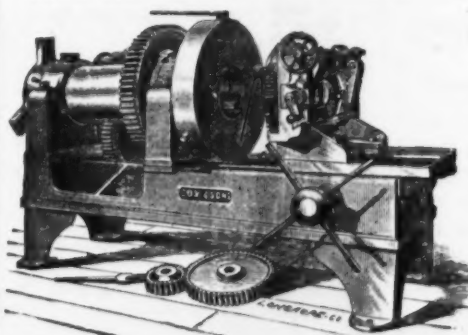
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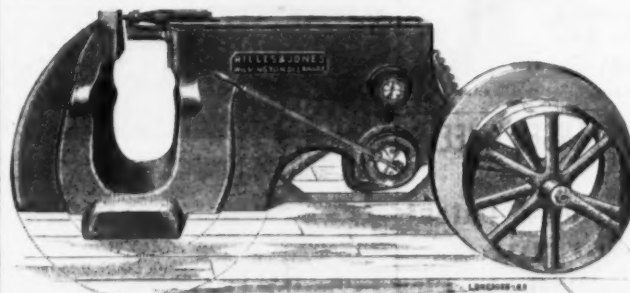
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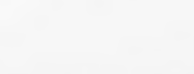
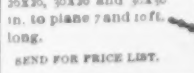
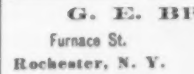
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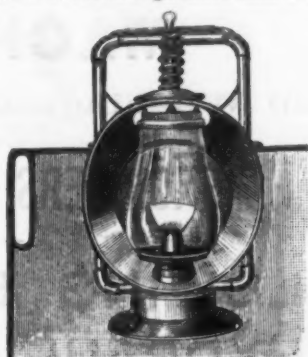
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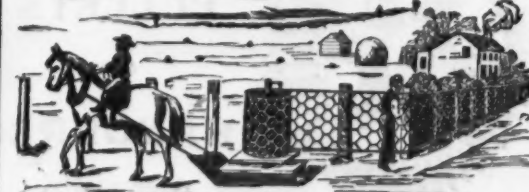
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